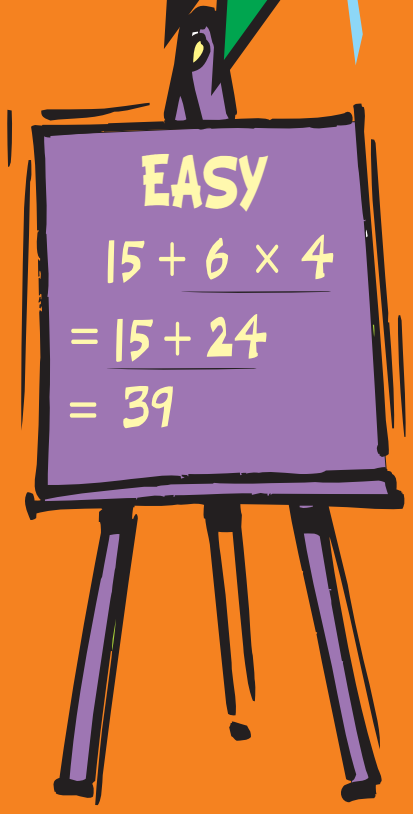
Mighty Maths

for 8 - 10 year olds

Master Mathematician

BOOK 3



More Success with Mathematics

Kim Freeman

Mighty Maths

for 8 - 10 year olds

Master Mathematician

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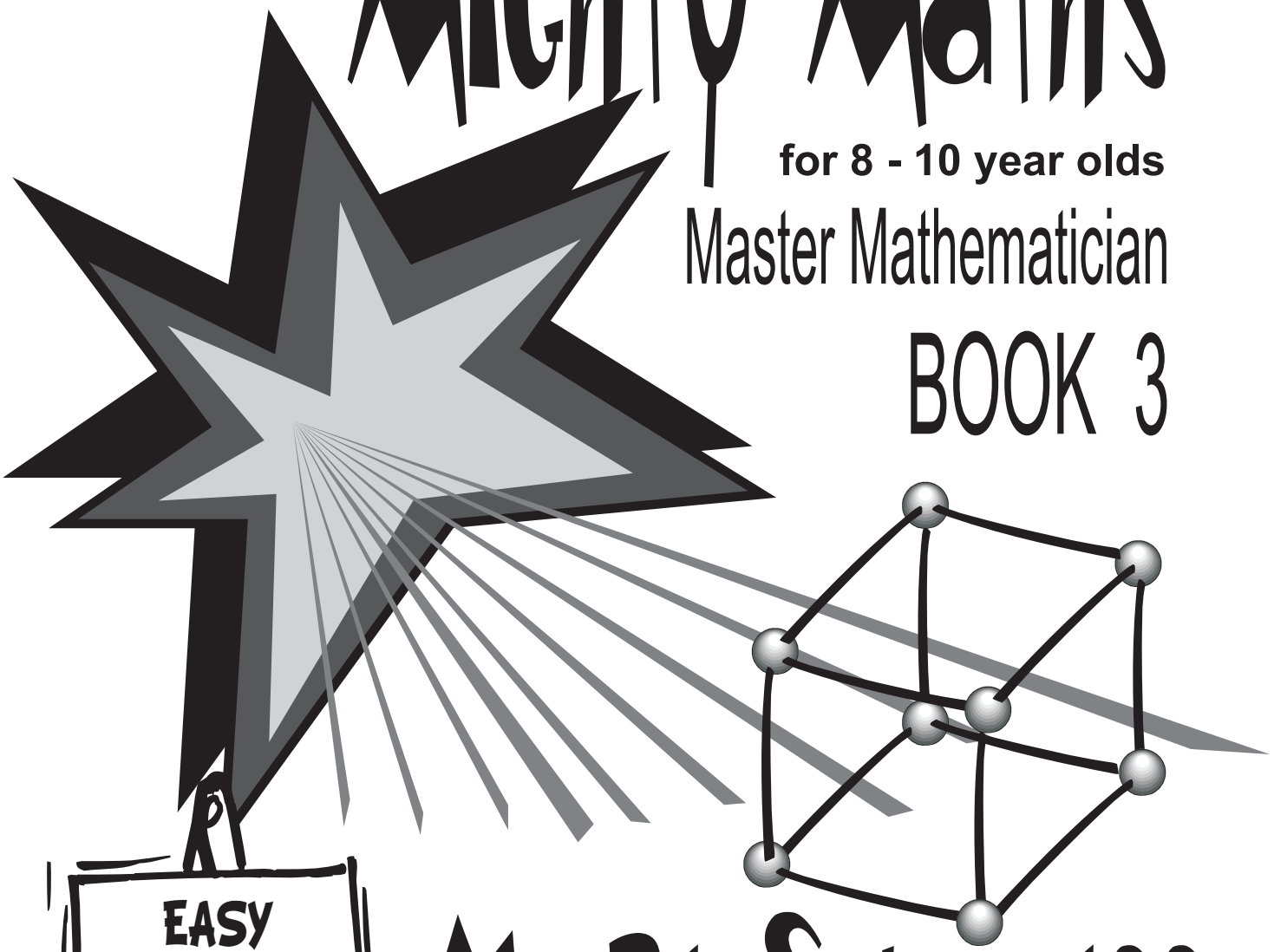
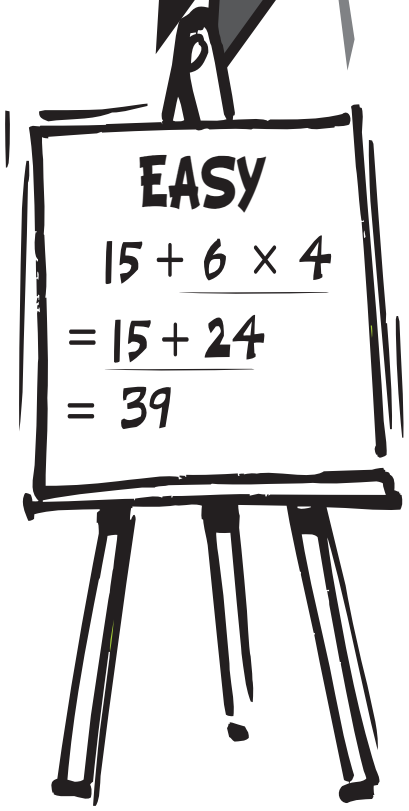




More Success with Mathematics

Kim Freeman

Mighty Maths for Mighty Maths for 8-10 year olds - Master Mathematician Book 3
More Success with Mathematics
Author, K. Freeman

eBook published in New Zealand in 2011 by:
Mahobe Resources (NZ) Ltd
P.O. Box 109-760
Newmarket, Auckland
New Zealand.

ISBN 9781877489228

Print Production by Imago Print Productions (F.E.) Pte. Ltd., Singapore.

Visit our website: www.mahobe.co.nz

HOW CAN YOU HELP YOUR CHILD IN MATHEMATICS?

As you progress through the school years, mathematics becomes slightly more complex but even more fascinating. There are many new concepts to learn, however being able to master the basics is still the key to developing confidence and being able to progress further.

This orange Mighty Maths series, Master Mathematician, introduces a number of new concepts such as adding and subtracting larger numbers, arithmetic order of operation and integers. Other topics such as number, decimals and fractions are expanded upon. The work is progressively more challenging and new concepts are introduced in each book at various points.

To help reinforce mathematical skills as well as to maintain motivation, the same type of question is asked in different ways and contexts. Don't worry if your child cannot understand one of the concepts. Quite often that same concept will be introduced in a different way later on in the book. If your child becomes comfortable with a particular way of solving a problem then let them carry on using this method.

A common question that is asked of mathematics teachers is whether a child should use a calculator at this stage of their learning. It is important that they learn and understand each basic concept and the underlying principles. Once that is achieved then there is a case for using the calculator so that they can further explore ways of solving the same problem and therefore increasing their understanding a lot quicker.

This specific book covers fun arithmetic, arithmetic order of operations, integers and integer arithmetic. There are then pages on fractions, decimals, percentages, square and square roots, perimeter, area, volume and probability. Finally there is a Mighty Maths test which is aimed at the 8 - 10 year old level of achievement.

For best results:

- Go over the pages that your child will work on and familiarise yourself with the exercises. Make sure your children understand the different concepts. Try and explain what is happening on each of the pages.

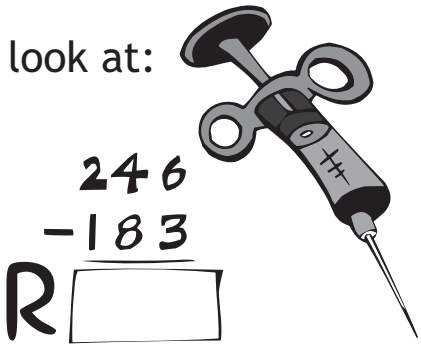
- Encourage your children to write neatly. Many errors in solving mathematics problems can be traced back to sloppy number writing.

- Provide help immediately when needed. Mathematics is a subject in which everything builds upon what has been previously learned. For example, a failure to understand fractions and decimals will lead to problems later with percentages.

What is found in this book?

In this book you look at:

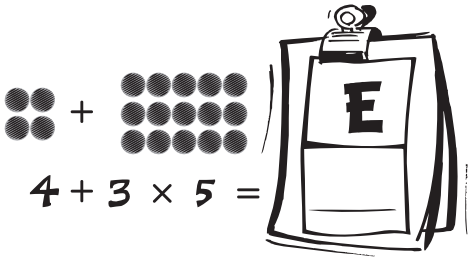
FUN ARITHMETIC

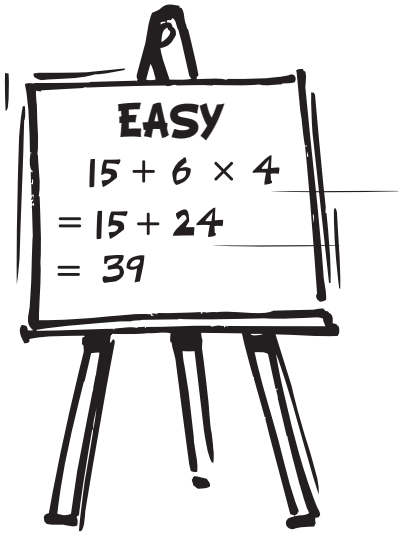


ORDER OF OPERATIONS

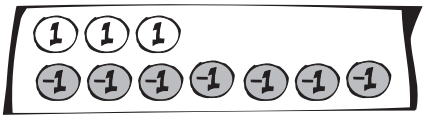
$5+2+2+2+2+2+2+2 = 19$

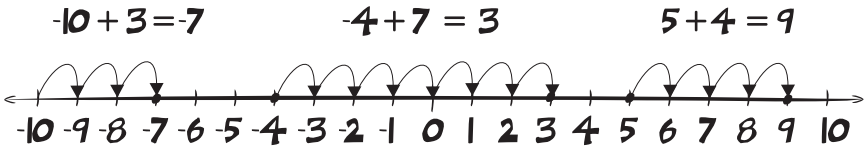
$\therefore 5 + 7 \times 2 = 19$



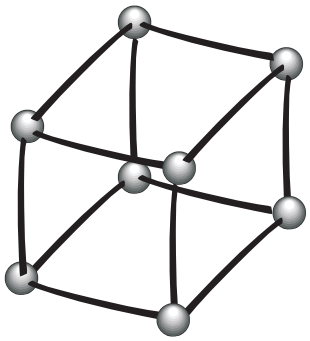


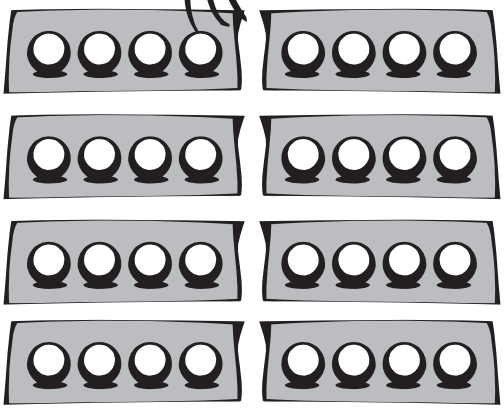
INTEGERS





A MIGHTY MATHS TEST



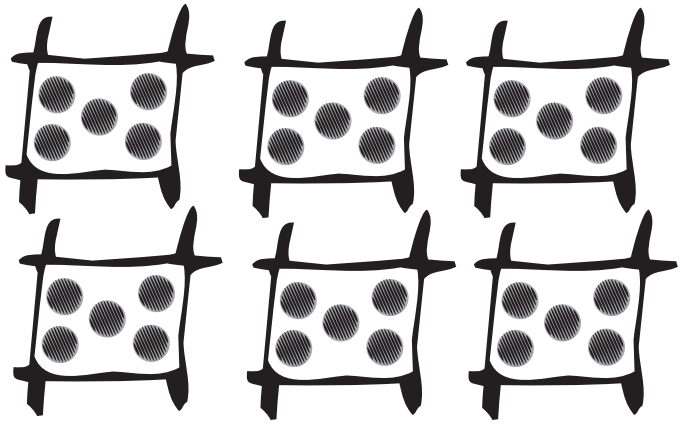


Write an addition, multiplication and division statement for each group.

4+4+_+_+_+_+_+_ = ___

8 × ___ = ___

___ ÷ 8 = ___



_+_+_+_+_+_ = ___

6 × ___ = ___

___ ÷ 6 = ___

Multiply the following:

4 × 8 = ☐	6 × 5 = ☐	5 × 8 = ☐
5 × 7 = ☐	4 × 9 = ☐	3 × 7 = ☐
9 × 10 = ☐	8 × 9 = ☐	6 × 4 = ☐
7 × 8 = ☐	9 × 3 = ☐	4 × 12 = ☐

BRAIN EXTENSIONS

Calculate
101 + 2002 + 30003 +400004 + 5000005

Answer the questions then crack the code on the next page. (The first two are done for you.)

$$\begin{array}{r} 7 \\ +\,8 \\ \hline 15 \end{array}$$ F

$$\begin{array}{r} 5 \\ +\,19 \\ \hline 24 \end{array}$$ W

$$\begin{array}{r} 25 \\ +\,10 \\ \hline \end{array}$$ H

$$\begin{array}{r} 12 \\ +\,14 \\ \hline \end{array}$$ B

$$\begin{array}{r} 35 \\ +\,22 \\ \hline \end{array}$$ K

$$\begin{array}{r} 47 \\ +\,31 \\ \hline \end{array}$$ T

$$\begin{array}{r} 17 \\ +\,19 \\ \hline \end{array}$$ Y

$$\begin{array}{r} 24 \\ +\,18 \\ \hline \end{array}$$ G

$$\begin{array}{r} 45 \\ +\,27 \\ \hline \end{array}$$ D

$$\begin{array}{r} 62 \\ +\,29 \\ \hline \end{array}$$ N

$$\begin{array}{r} 54 \\ +\,57 \\ \hline \end{array}$$ S

$$\begin{array}{r} 73 \\ +\,28 \\ \hline \end{array}$$ M

$$\begin{array}{r} 65 \\ +\,78 \\ \hline \end{array}$$ I

$$\begin{array}{r} 33 \\ +\,97 \\ \hline \end{array}$$ R

$$\begin{array}{r} 146 \\ +\,273 \\ \hline \end{array}$$ C

$$\begin{array}{r} 262 \\ +\,119 \\ \hline \end{array}$$ O

$$\begin{array}{r} 455 \\ +\,275 \\ \hline \end{array}$$ A

$$\begin{array}{r} 387 \\ +\,428 \\ \hline \end{array}$$ E

DOCTOR DOCTOR .....

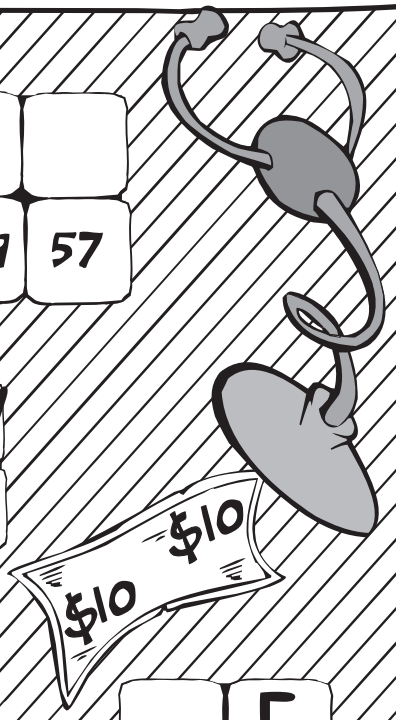
I SWALLOWED A $10 NOTE!

419	381	101	815

26	730	419	57

78	381	101	381	130	130	381	24

W



730	91	72

111	815	815

F

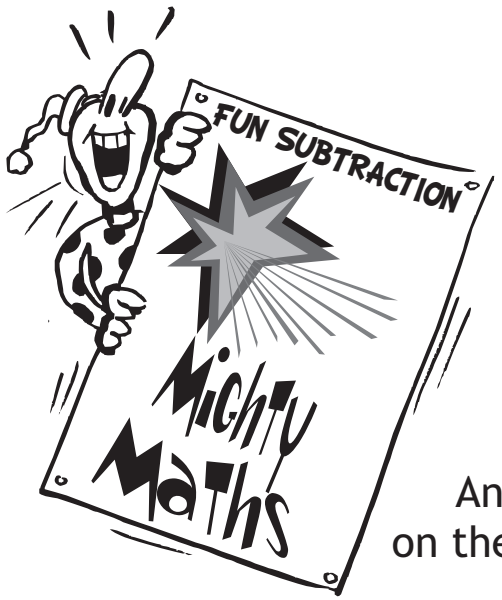
143	15

78	35	815	130	815

143	111

730	91	36

419	35	730	91	42	815



BRAIN EXTENSIONS

The pattern 123451234512345.... is continued until a 1000 digit number is formed. What is the sum of all the 1000 digits?

Answer the questions then crack the code on the next page. (The first one is done for you.)

9 − 3 = F 6	18 − 15 = U	27 − 12 = K	42 − 20 = E
56 − 15 = Y	20 − 18 = D	44 − 27 = P	32 − 6 = L	55 − 39 = M
392 − 159 = A	287 − 148 = S	127 − 95 = N	246 − 183 = R
654 − 128 = T	532 − 215 = I	434 − 187 = L	251 − 177 = O

DOCTOR DOCTOR .....

I CAN'T STOP MY HANDS FROM SHAKING!

2	74

41	74	3

2	63	317	32	15

233

247	74	526

?

32	74	526

63	22	233	247	26	41

317

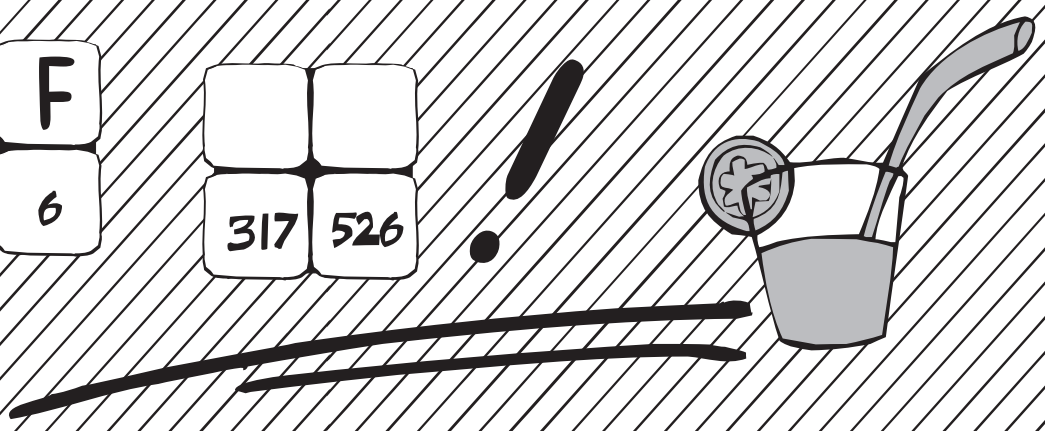
139	17	317	247	26

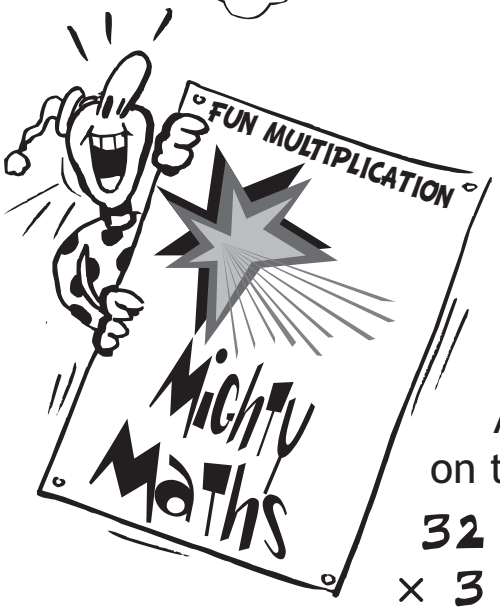
16	74	139	526

	F
74	6

317	526

!





BRAIN EXTENSIONS

Calculate half of 999.

Calculate 2002 × 5

If 657 is multiplied by 1729
what is the units digit of the answer?

Answer the questions then crack the code on the next page. (The first one is done for you.)

$32 \times 3 = 96$ → I

$17 \times 5 =$ ___ → R

$23 \times 7 =$ ___ → L

$35 \times 6 =$ ___ → P

$49 \times 8 =$ ___ → F

$34 \times 9 =$ ___ → C

$26 \times 8 =$ ___ → W

$123 \times 4 =$ ___ → O

$46 \times 3 =$ ___ → T

$121 \times 5 =$ ___ → A

$137 \times 8 =$ ___ → J

$181 \times 6 =$ ___ → U

$144 \times 3 =$ ___ → N

$259 \times 2 =$ ___ → E

$168 \times 4 =$ ___ → S

DOCTOR DOCTOR .....

I SWALLOWED A PEN. WHAT SHOULD I DO?

1096	1086	672	138

1086	672	518

605

210	518	432	306	96	161

392	492	85

432	492	208

BRAIN EXTENSIONS

The value of $\frac{\square}{5}$ lies between 9 and 10.

What are the possible values of $\square$?

BRAIN EXTENSIONS

Replace each blank with the correct digit.

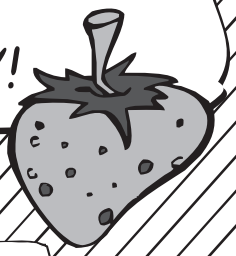
$$\begin{array}{r} 1\ 9\ \_\ 6 \\ 3\ \_ \\ +\ \_\ 7\ 8 \\ \hline 2\ 5\ 3\ 8 \end{array}$$

Answer the questions then crack the code on the next page. (The first one is done for you)

$28 \div 2 =$ H 14	$36 \div 9 =$ V
$35 \div 5 =$ S	$42 \div 21 =$ C
$21 \div 7 =$ I	$40 \div 4 =$ F
$30 \div 2 =$ T	$12 \div 1 =$ R
$24 \div 3 =$ M	$50 \div 2 =$ O
$90 \div 10 =$ E	$80 \div 4 =$ A

DOCTOR DOCTOR .....

I THINK I'M A STRAWBERRY!



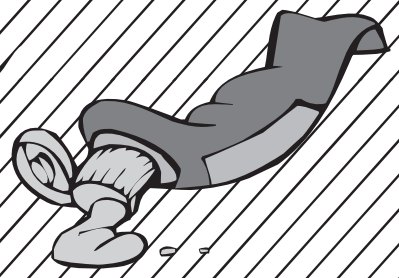
	H			
3	14	20	4	9

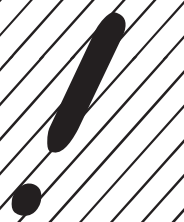
7	25	8	9	

2	12	9	20	8	

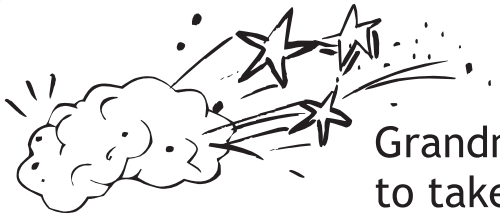
10	25	12			

15	14	20	15	





BRAIN EXTENSIONS



Grandma puts a pie in the oven and has to take it out exactly 10 minutes later. However she only has 2 egg timers - a four minute timer and a 7 minute timer. How can she use the timers to measure exactly 10 minutes?

FUN ARITHMETIC

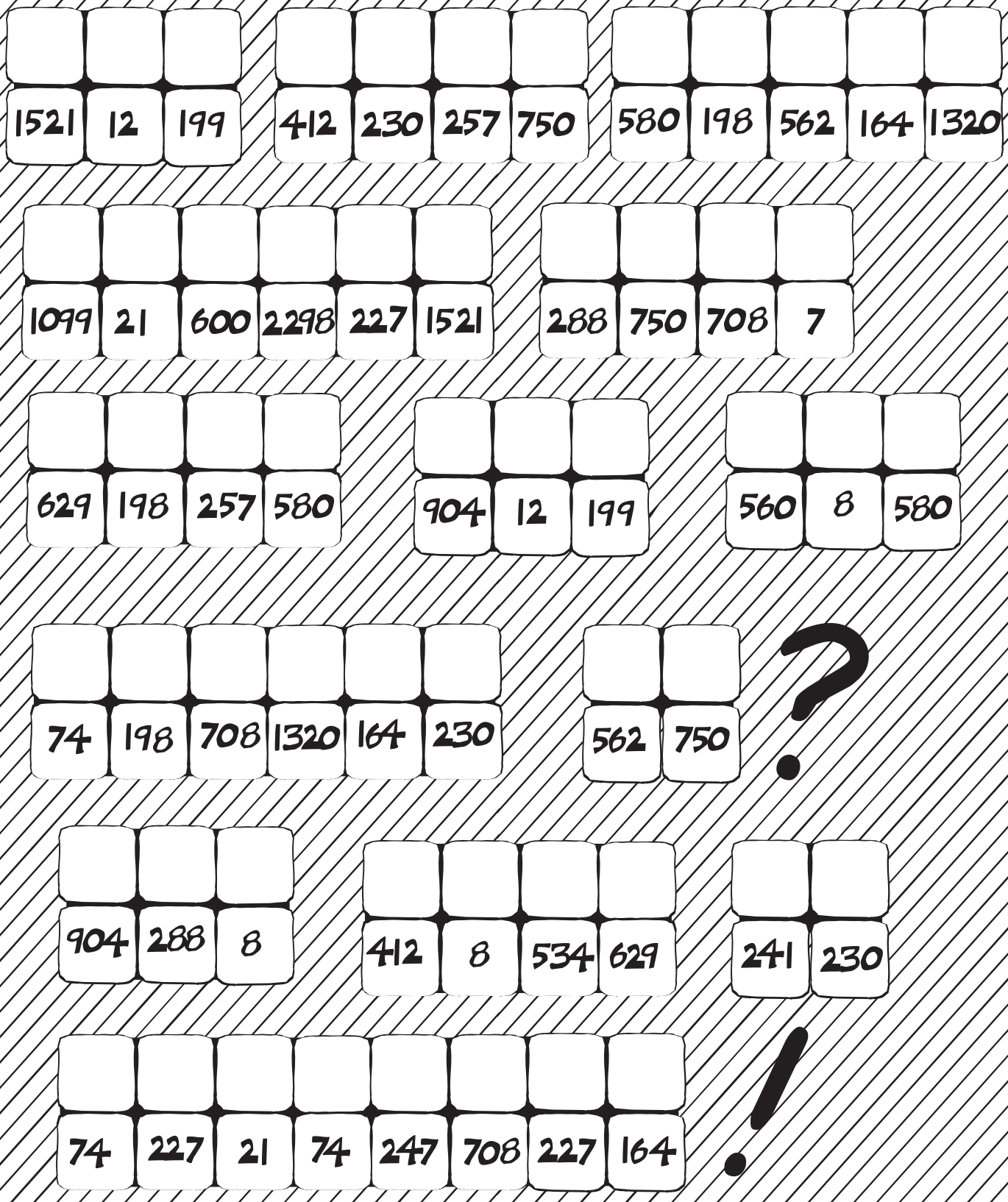
157 + 255 = M ☐	314 + 286 = V ☐	285 + 275 = P ☐	93 + 148 = B ☐
459 + 170 = T ☐	268 + 266 = S ☐	131 + 99 = E ☐	343 + 219 = O ☐
432 − 185 = K ☐	375 − 148 = R ☐	213 − 139 = C ☐	304 − 106 = H ☐
554 − 266 = O ☐	410 − 153 = A ☐	222 − 58 = S ☐	371 − 172 = U ☐
375 × 2 = N ☐	113 × 8 = Y ☐	236 × 3 = E ☐	145 × 4 = T ☐
264 × 5 = E ☐	157 × 7 = S ☐	383 × 6 = O ☐	169 × 9 = Y ☐

35 ÷ 5 = S ☐ 42 ÷ 2 = A ☐

56 ÷ 7 = U ☐ 60 ÷ 5 = O ☐

DOCTOR DOCTOR .....

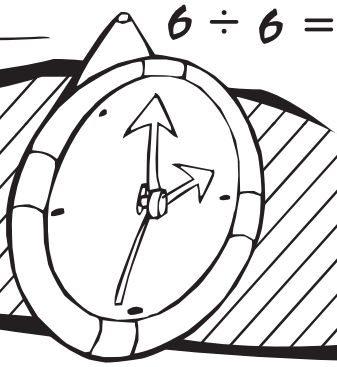
I THINK I'M A BISCUIT!



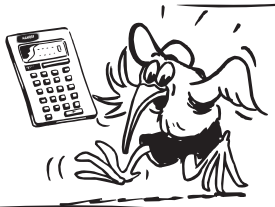
BEAT THE CALCULATOR

Time yourself on the first set without using a calculator. On the second set use a calculator. Which method is quickest? Which has the least mistakes?

8 + 6 = ____	2 + 19 = ____	
14 + 5 = ____	27 + 12 = ____	
17 − 6 = ____	23 − 15 = ____	12 − 8 = ____
25 − 7 = ____	10 − 2 = ____	27 − 17 = ____
12 × 6 = ____	8 × 9 = ____	4 × 11 = ____
5 × 7 = ____	10 × 5 = ____	0 × 3 = ____
20 ÷ 5 = ____	36 ÷ 4 = ____	6 ÷ 6 = ____

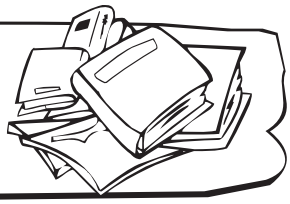


18 + 7 = ____	13 + 7 = ____	4 + 27 = ____
2 + 9 = ____	26 + 15 = ____	25 + 15 = ____
13 − 8 = ____	25 − 19 = ____	14 − 2 = ____
23 − 7 = ____	13 − 4 = ____	33 − 16 = ____
15 × 6 = ____	8 × 8 = ____	5 × 13 = ____
9 × 7 = ____	10 × 7 = ____	
200 ÷ 5 = ____	125 ÷ 5 = ____	



BRAIN EXTENSIONS

Kim Freeman asks you to open your maths book to the facing pages whose numbers sum to 85. Which pages should you turn to?



Jones saves $2 during January, $4 during February and $6 during March. If he continues with the same savings pattern how much will he have saved after 1 year?

All the numbers from 0 to 16 must be placed in the squares.

The sum of the 4 numbers in each row, column and diagonal is 30.

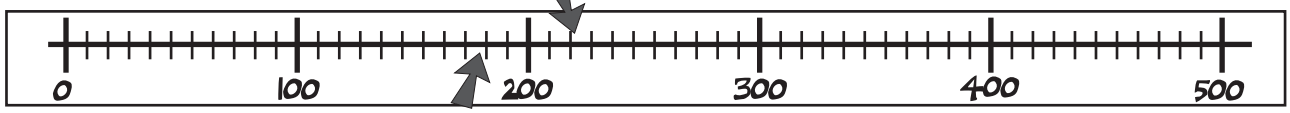
3		14	0
	10		
8			11
15			12

The average of seven numbers is 100.
If 1 is added to the first number, 2 is added to the second number, 3 is added to the third number and so on up to the seventh number, what is the new average?

ROUNDING

Give these amounts to the nearest hundred dollars.

221 = 200 (To the nearest 100)



179 = 200 (To the nearest 100)

$219	$654	$839
$1579	$92	$45

Round these amounts to the nearest ten.

49 ≃	268 ≃	534 ≃
1111 ≃	227 ≃	455 ≃

Rewrite these times to the nearest hour.

1 hr 15 min ≃

29 min ≃

33 min ≃

100 min ≃

5 hr 50 min ≃

90 min ≃

EVENS ODDS & PATTERNS

Even numbers divide exactly by: _____

List the even numbers between 50 and 80.

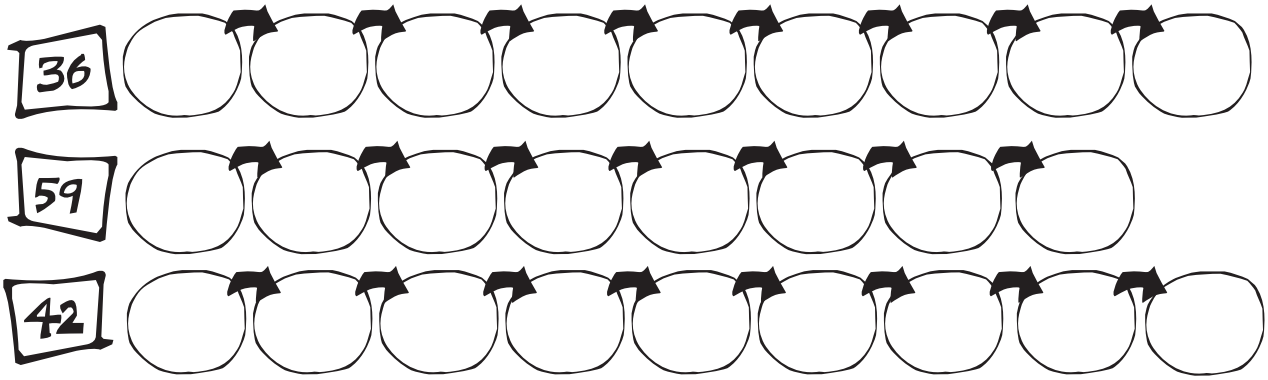
_____

List the odd numbers between 20 and 30.

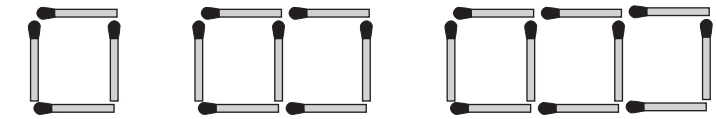
_____

Look at the pattern below. If the number is even then it is divided by 2. If the number is odd then 1 is added to it.

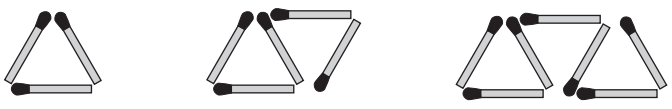
Use the rule to complete these patterns.



Draw the next picture in the match-stick pattern.
Write how many sticks are needed for each pattern.



_____ _____ _____ _____



_____ _____ _____ _____

ORDER OF OPERATIONS

Calculate the answers to these sums.
Then write the sums in a different way and calculate the answer.

$5+2+2+2+2+2+2+2 = 19$

$\therefore\ 5 + 7 \times 2 = 19$

$6+4+4+4 =$ ____

$\therefore\ 6 + 3 \times 4 =$ ____

∴ means therefore.

$12+6+6+6+6+6 =$ ____

$\therefore$ ____

$8+5+5+5+5+5+5+5+5 =$ ____

$\therefore$ ____

$27+12+12 =$ ____

$\therefore$ ____

$25+3+3+3+3+3 =$ ____

$\therefore$ ____

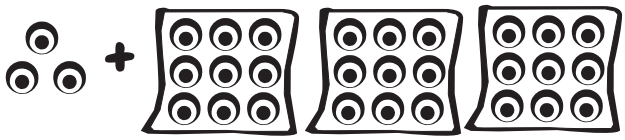
$19+1+1+1+1+1+1+1+1+1+1+1+1 =$ ____

$\therefore$ ____

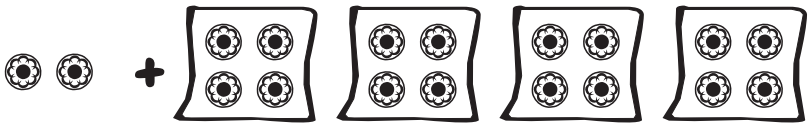
$9+8+8+8+8+8+8 =$ ____

$\therefore$ ____

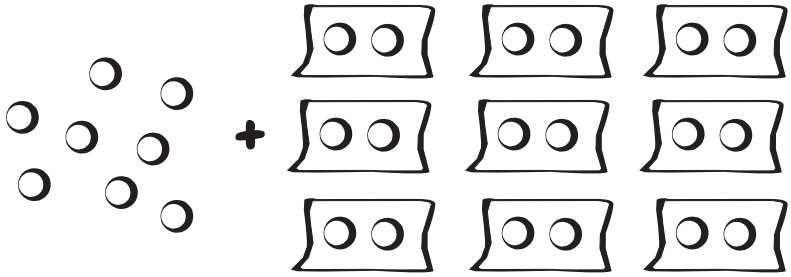
Calculate the answer to each sum.
Hint: Use the diagrams to help.



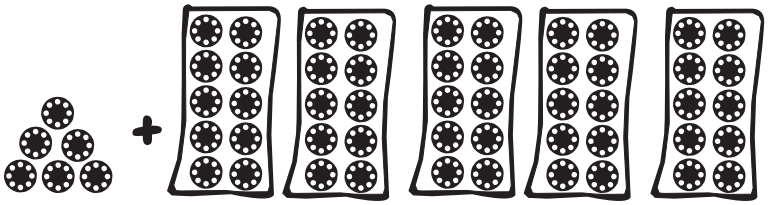
$3 + 3 \times 9 =$ ____



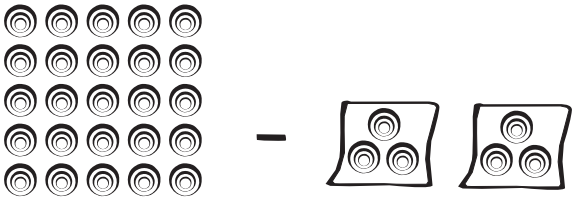
$2 + 4 \times 4 =$ ____



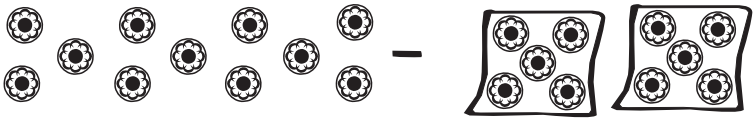
$8 + 9 \times 2 =$ ____



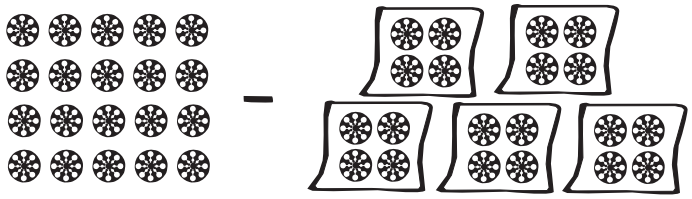
$6 + 5 \times 10 =$ ____



$25 - 2 \times 3 =$ ____



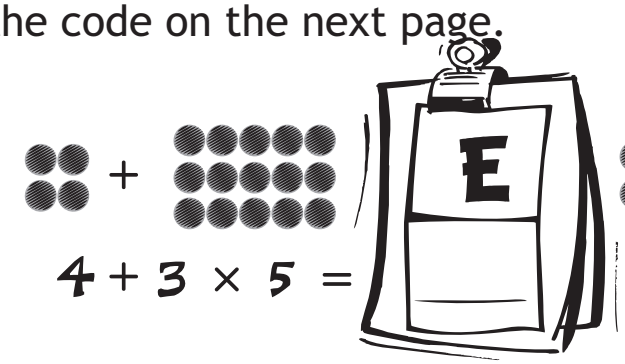
$11 - 2 \times 5 =$ ____

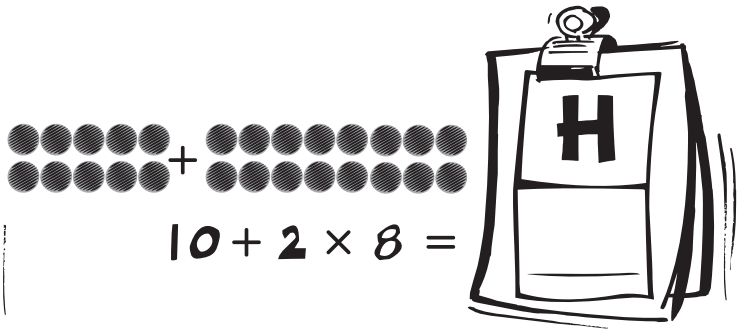


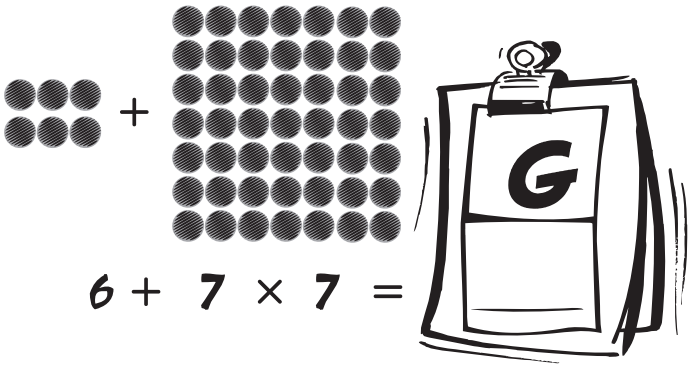
$20 - 5 \times 4 =$ ____

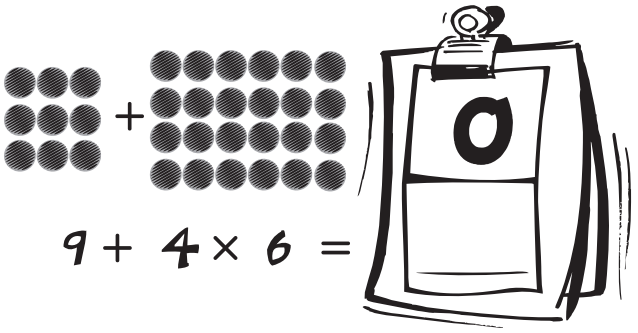
ORDER OF OPERATIONS

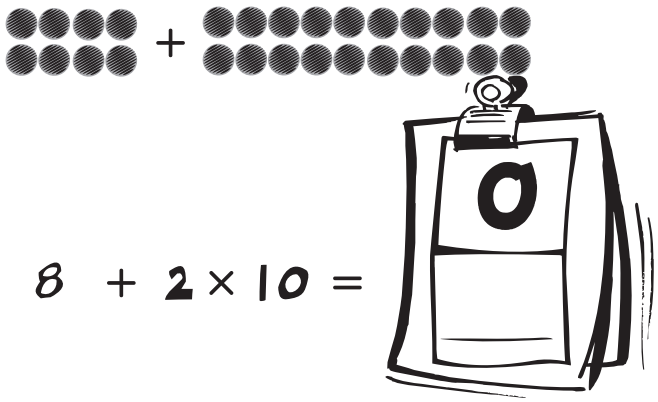
The rules of arithmetic state that you must do multiplication before addition. Complete the sums then work out the answer to the code on the next page.

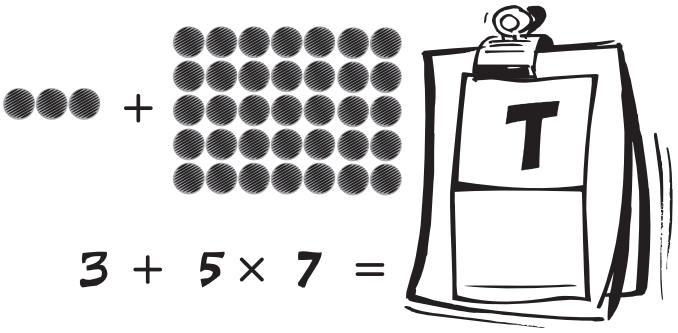


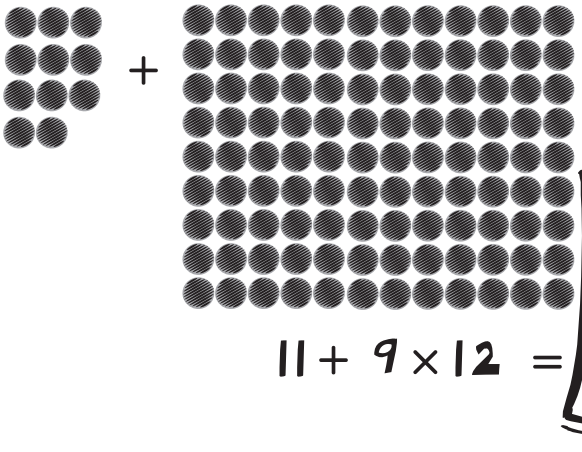


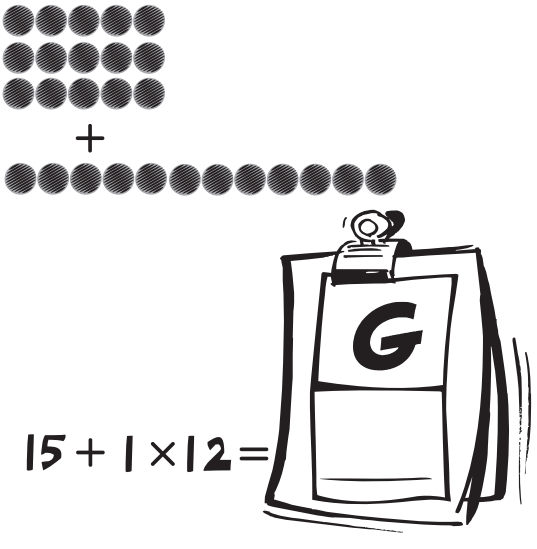


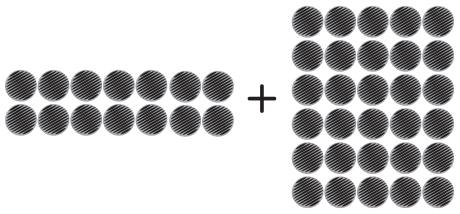






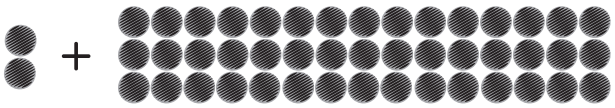






$14 + 6 \times 5 =$

D

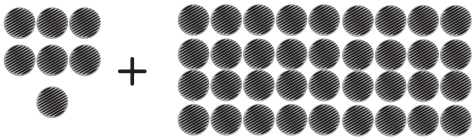


$2 + 3 \times 15 =$

S

$5 + 2 \times 13 =$

E



$7 + 4 \times 9 =$

Y

What do you need to spot an iceberg 20km away?

55	28	33	44

19	43	31	47	119	27	26	38

BODMAS

If a sum such as 4+5×2 has no brackets then it has been agreed by mathematicians that the multiplying is to be calculated before the addition. 4+5×2 = 14

If a sum has brackets such as 3×(8+2) then it has been agreed by mathematicians that the part inside the brackets will always be calculated first. 3×(8+2) = 30

There is an easy way to remember this - BODMAS.

1. Calculate Brackets first.
2. Calculate Division and Multiplication in the order they are written.
3. Calculate Addition and Subtraction in the order they are written.

Look at these examples:

$10 \times (2 + 7) = 90$ Calculate brackets (2+7)=9 then multiply by 10.

$12 \times 2 \div 8 = 3$ Calculate the multiplication and division in the order that they occur 12×2=24, 24÷8=3.

Now try these.

$7 + 3 \times 3 =$ ____

$10 - 3 \times 3 =$ ____

$6 + 3 \times 2 =$ ____

$8 \times 4 + 5 =$ ____

$9 + 4 \div 2 =$ ____

$5 + (6 \times 3) =$ ____

$12 + 6 - 3 =$ ____

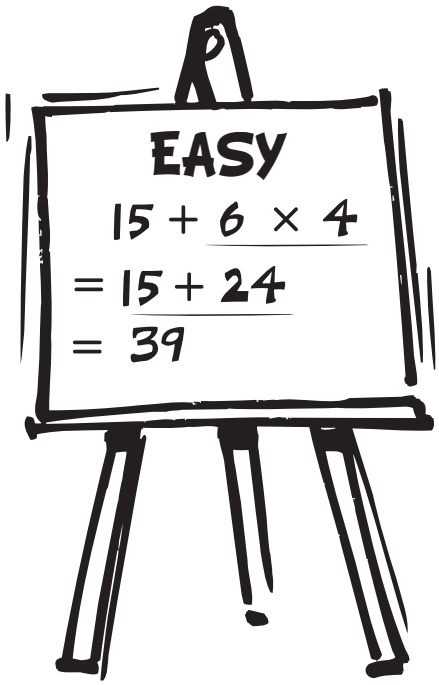
$24 \div 3 \times 2 =$ ____

$15 + 5 \times 4 =$ ____

$10 \times 4 \div 2 =$ ____

$10 + 3 \times 2 =$ ____

$8 + (4 \times 2) \times 2 =$ ____



Look at these BODMAS examples then answer the exercises:

STEP 1

Calculate multiplication and division in the order they occur 6x4=24

STEP 2

Calculate addition and subtraction in the order they occur 15+24=39

$3 + 4 \times 7 =$ ____

$50 - 5 \times 5 =$ ____

$16 + 3 \times 2 =$ ____

$18 - 2 \div 2 =$ ____

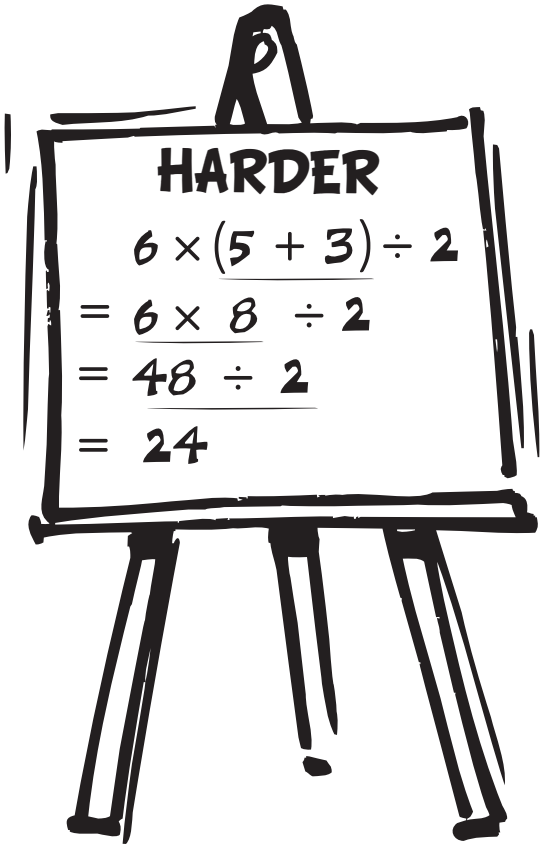
$19 - 2 \times 8 =$ ____

$40 + 7 \times 7 =$ ____

$23 + 5 \times 2 =$ ____

$22 + 15 \div 3 =$ ____

$12 - 8 \div 4 =$ ____



STEP 1

First calculate the sum inside the brackets (5+3) = 8

STEP 2

Calculate multiplication and division in the order they occur 6x8=48, 48÷2=24

$(3+3) \times (2 \times 2) =$ ____

$3 \times (8 + 2) \div 5 =$ ____

$40 \div (6 + 2) \times 3 =$ ____

$(9 + 4 \times 3) \div 7 =$ ____

$70 - (3 \times 4) \times 5 =$ ____

BODMAS

$100 - 20 \times 4$

$(45 - 15) + (37 - 7)$

$15 + 6 \times 6$

$(3 + 5) \times (3 + 6)$

$(5 + 5) \times (5 - 3)$

$50 - 7 \times 6$

$(4 + 8) \times (8 - 2)$

$(10 - 3) + (6 \times 6)$

$(6 \times 7) + (2 \times 5)$

$58 - (4 \times 7)$

$88 - (10 \times 1)$

$(7 \times 7) + (4 \times 8)$

$(45 - 23) + (5 \times 8)$

$38 - 5 \times 7$

$100 - 45 + 7 \times 7$

$45 - 9 \times 4$

Each of these sums has the brackets in a different place.
Calculate each of the answers.

$(4 + 4) \times 5 - 2 =$ ____

$4 + (4 \times 5) - 2 =$ ____

$4 + 4 \times (5 - 2) =$ ____

$4 + 4 \times 5 - 2 =$ ____

$(2 + 3) \times 4 - 1 =$ ____

$2 + (3 \times 4) - 1 =$ ____

$2 + 3 \times (4 - 1) =$ ____

$2 + 3 \times 4 - 1 =$ ____

Make the sums correct by putting in brackets to show which part has been completed first (one sum has no brackets).

$9 + 4 \times 5 - 3 = 26$

$9 + 4 \times 5 - 3 = 17$

$9 + 4 \times 5 - 3 = 62$

$9 + 4 \times 5 - 3 = 26$

If there was no BODMAS rule then everybody who did arithmetic would get different answers. Use the rule to calculate the following:

$3 + 4 \times 3 =$

$7 - 6 + 11 =$

$2 \times 2 \times 4 =$

$(2 + 2) \times 5 =$

$8 + 3 \times 3 =$

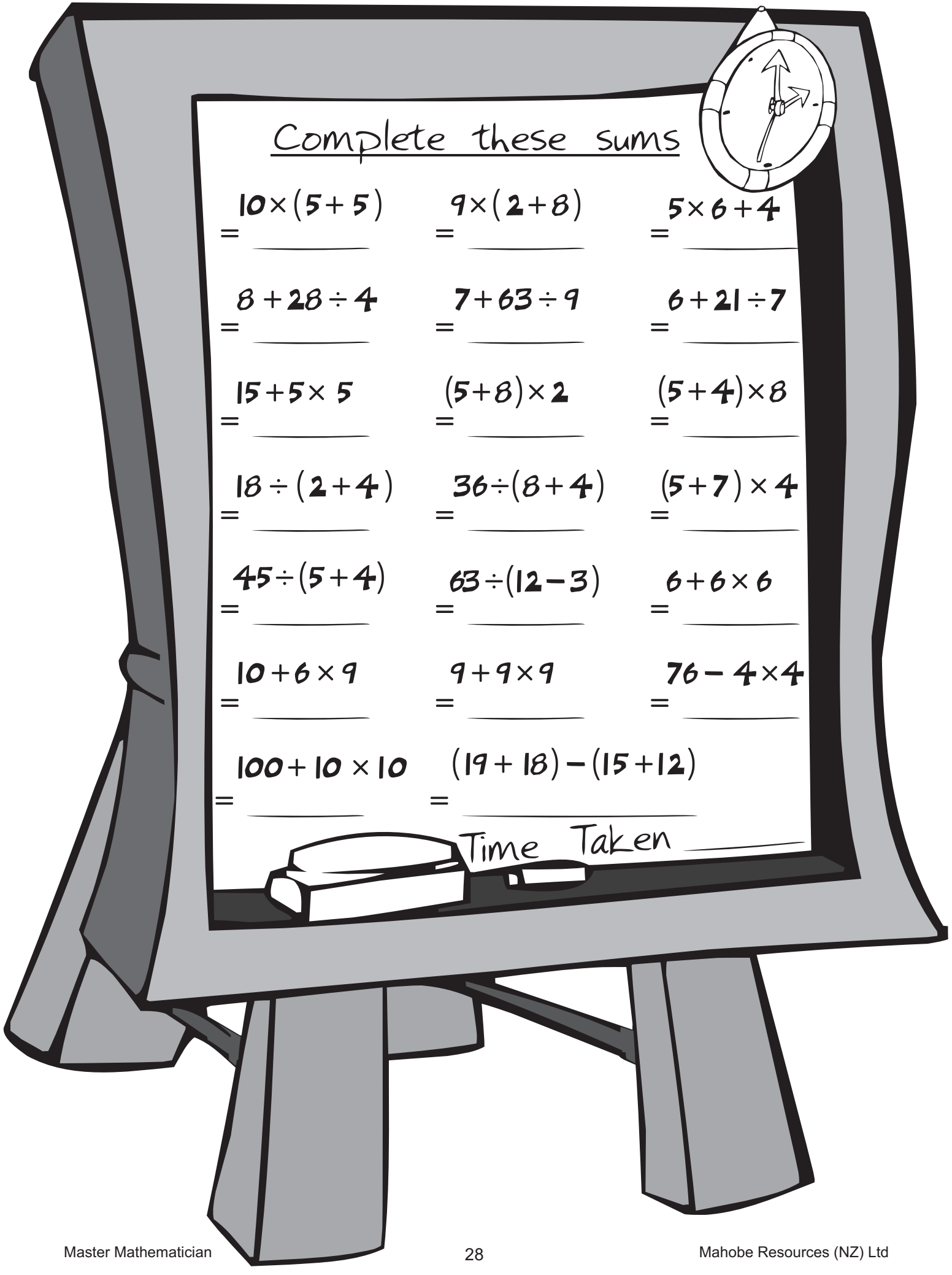
$5 \times 6 - 5 =$

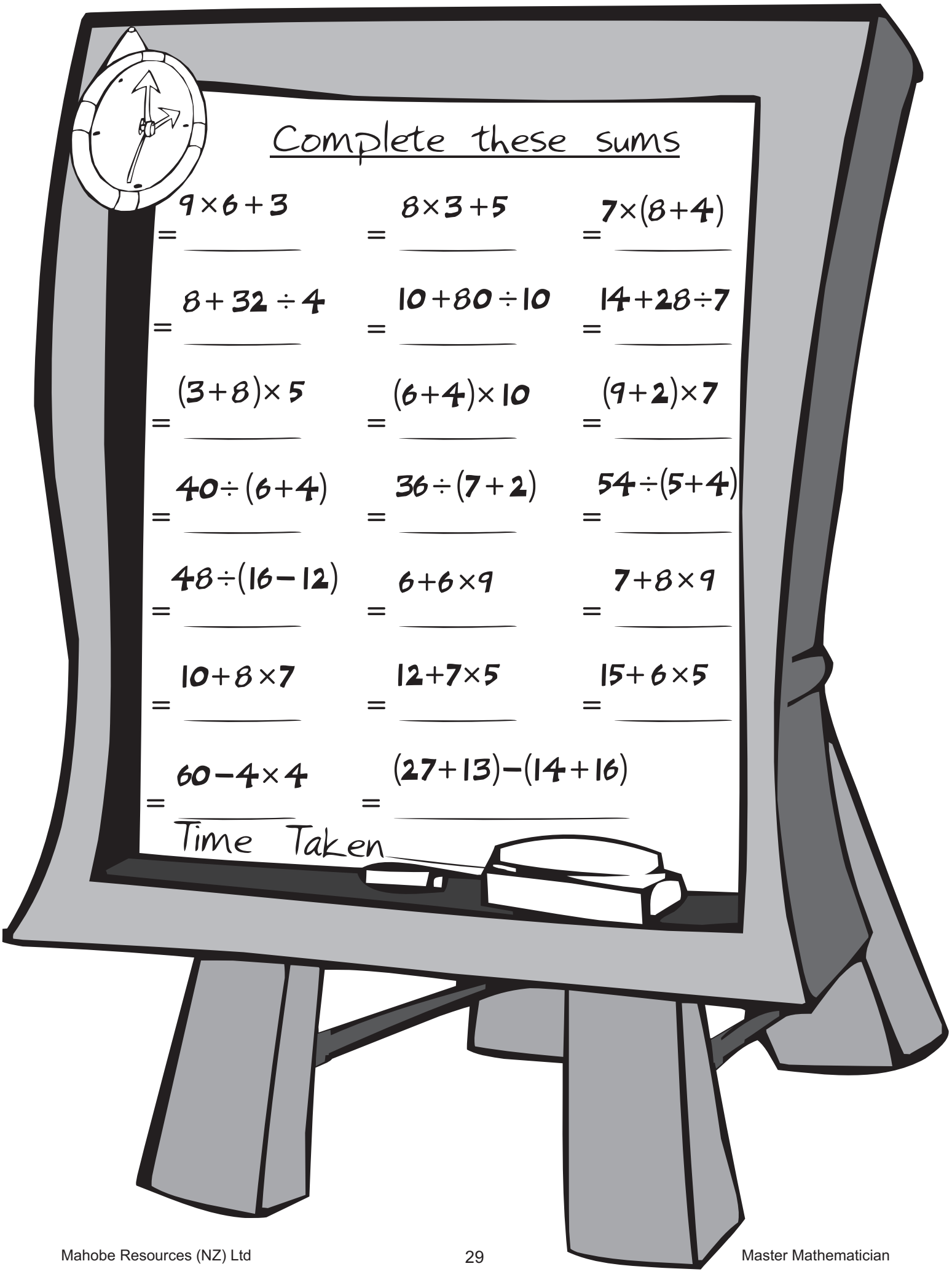
$10 \div 5 + 5 =$

$2 + 3 \times 6 =$

$(10 + 2) \div 4 =$

$5 + 4 \times 4 =$


Complete these sums
10×(5+5) = _____
9×(2+8) = _____
5×6+4 = _____
8+28÷4 = _____
7+63÷9 = _____
6+21÷7 = _____
15+5×5 = _____
(5+8)×2 = _____
(5+4)×8 = _____
18÷(2+4) = _____
36÷(8+4) = _____
(5+7)×4 = _____
45÷(5+4) = _____
63÷(12−3) = _____
6+6×6 = _____
10+6×9 = _____
9+9×9 = _____
76−4×4 = _____
100+10×10 = _____
(19+18)−(15+12) = _____
Time Taken _____


Complete these sums
9×6+3 = _____
8×3+5 = _____
7×(8+4) = _____
8+32÷4 = _____
10+80÷10 = _____
14+28÷7 = _____
(3+8)×5 = _____
(6+4)×10 = _____
(9+2)×7 = _____
40÷(6+4) = _____
36÷(7+2) = _____
54÷(5+4) = _____
48÷(16−12) = _____
6+6×9 = _____
7+8×9 = _____
10+8×7 = _____
12+7×5 = _____
15+6×5 = _____
60−4×4 = _____
(27+13)−(14+16) = _____
Time Taken

BODMAS

Use the BODMAS rules of arithmetic to complete the sums.
Use the answers to work out the code on the next page.

$35 - 25 \div 5 =$	T
$(6+2) \times 9 =$	O
$38 + 12 \div 4 =$	A
$12 + 4 \times 4 =$	G
$8 \times 6 \div 8 =$	W
$20 + 9 \times 4 =$	Y
$100 - 20 \times 4 =$	H
$17 + (8 \times 2) =$	U
$27 - (6 \div 2) \times 3 =$	T
$35 - (16 + 12) =$	L

$100 - (5 \times 3) + 28 \div 4 =$ ____ E

$21 + 9 \times 2 \div 9 =$ ____ I

$36 - (2 \times 4) + 20 \div 5 =$ ____ A

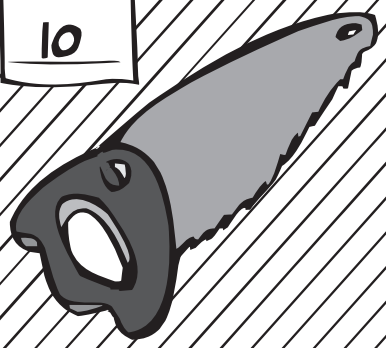
$(5 - 3) \times (5 - 3) + 6 =$ ____ F

What happens when you saw a comedian in half?

56	72	33	28	92	30

32	20	41	7	10

6	23	18



< means less than

> means greater than

The arrow always points to the smaller number.

Put in a greater or less than sign to make these statements correct.

$6 + 5 \times 3$	☐	$3 \times 4 + 6$
$9 \times 9 - 20$	☐	$7 \times 7 + 20$
$2 \times 20 + 46$	☐	$56 + 4 \times 10$
$10 + 10 \times 5$	☐	$10 + 5 \times 5$
$100 - 6 \times 7$	☐	$6 \times 7 + 40$
$150 + 5 \times 8$	☐	$40 \times 5 + 5$

Rewrite these sums and calculate the answer.

$4+4+4+4+4+3+3+3+3 =$ 5×4 + 4×3

$=$ 32

$8+8+8+2+2+2+2+2 =$ _____

$=$ _____

$7+7+7+7+5+5+5+5+5+5+5 =$ _____

$=$ _____

$6+6+9+9+9 =$ _____

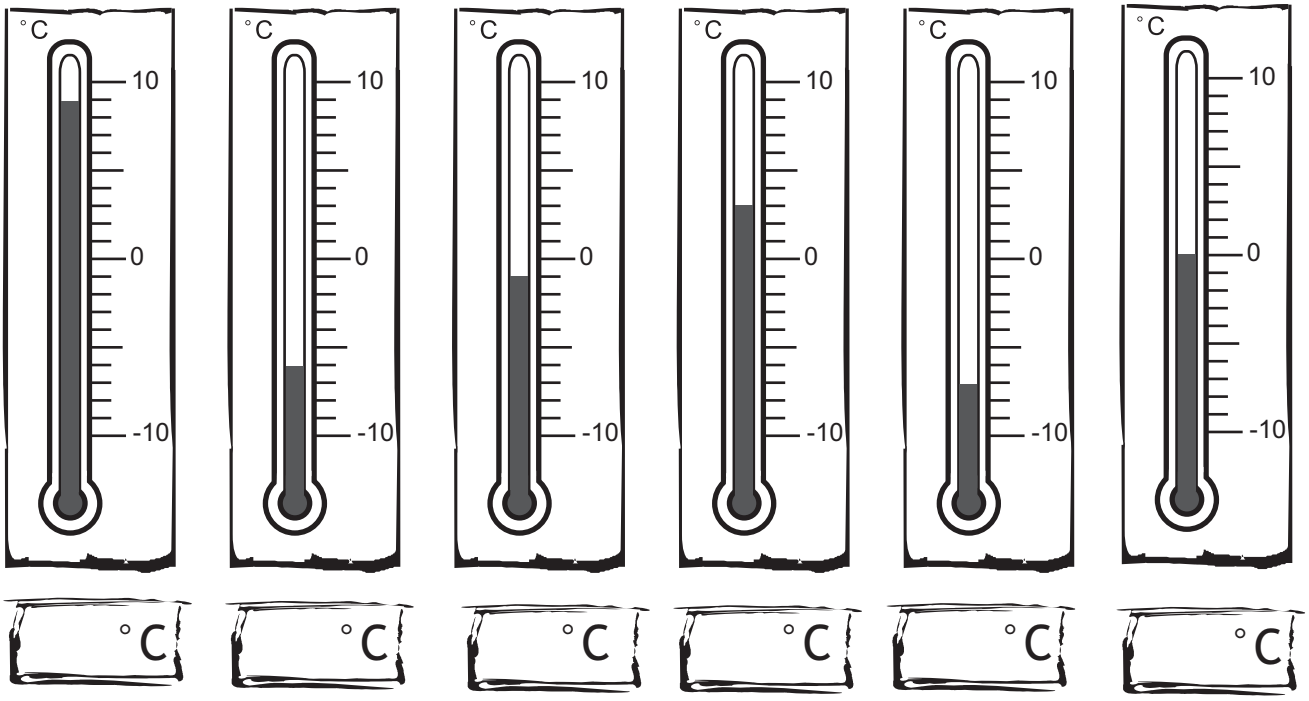
$=$ _____

$1+1+1+1+1+1+1+1+1+1+7+7 =$ _____

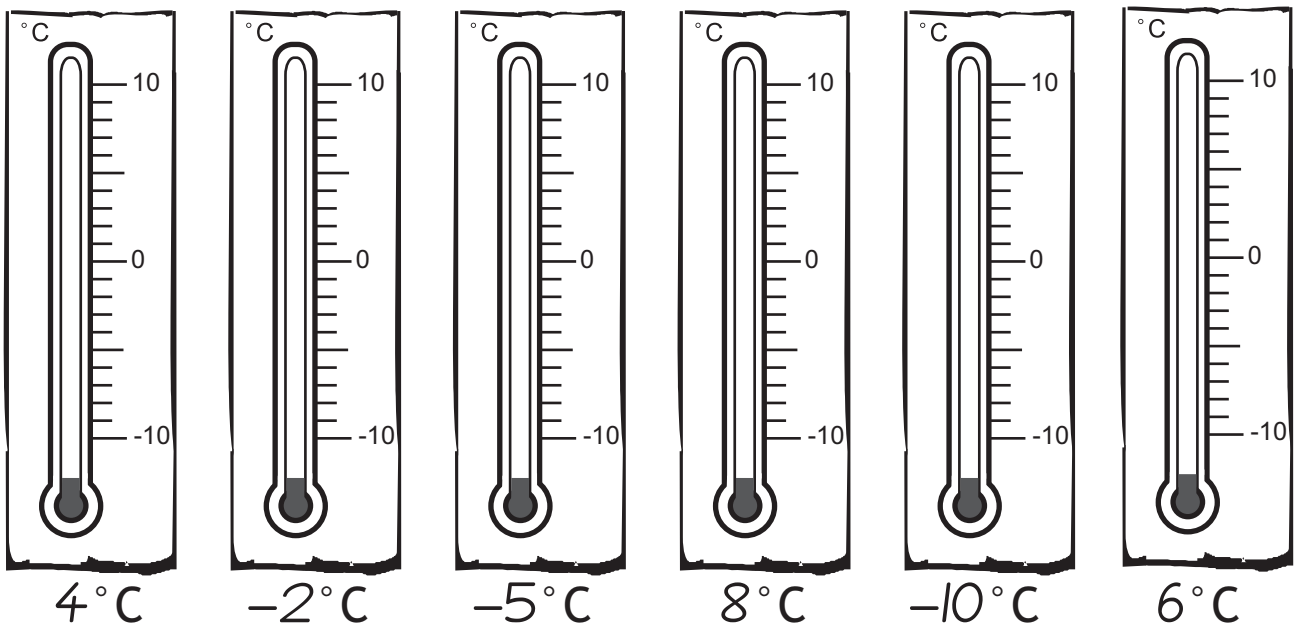
$=$ _____

TEMPERATURES

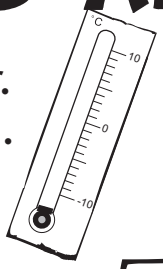
Write the temperature shown on each thermometer.



Colour the temperatures onto the thermometers.



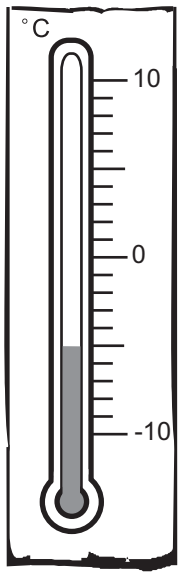
TEMPERATURES ARE HOT



Circle the temperature which is warmer.
Indicate how many degrees warmer it is.
(The first one is done for you.)

(8 °C) 3 °C	5 °C	-3 °C 5 °C	°C	4 °C -10 °C	°C
-3 °C 2 °C	°C	-4 °C -8 °C	°C	-6 °C 2 °C	°C

Use the thermometer to help work out the temperature changes.



The temperature starts at -5°C.

New Temperature

It then rises by 2°C _____

It then rises by 13°C _____

It then falls by 4°C _____

It then falls by 10°C _____

It then falls by 6°C _____

What could the temperatures be?

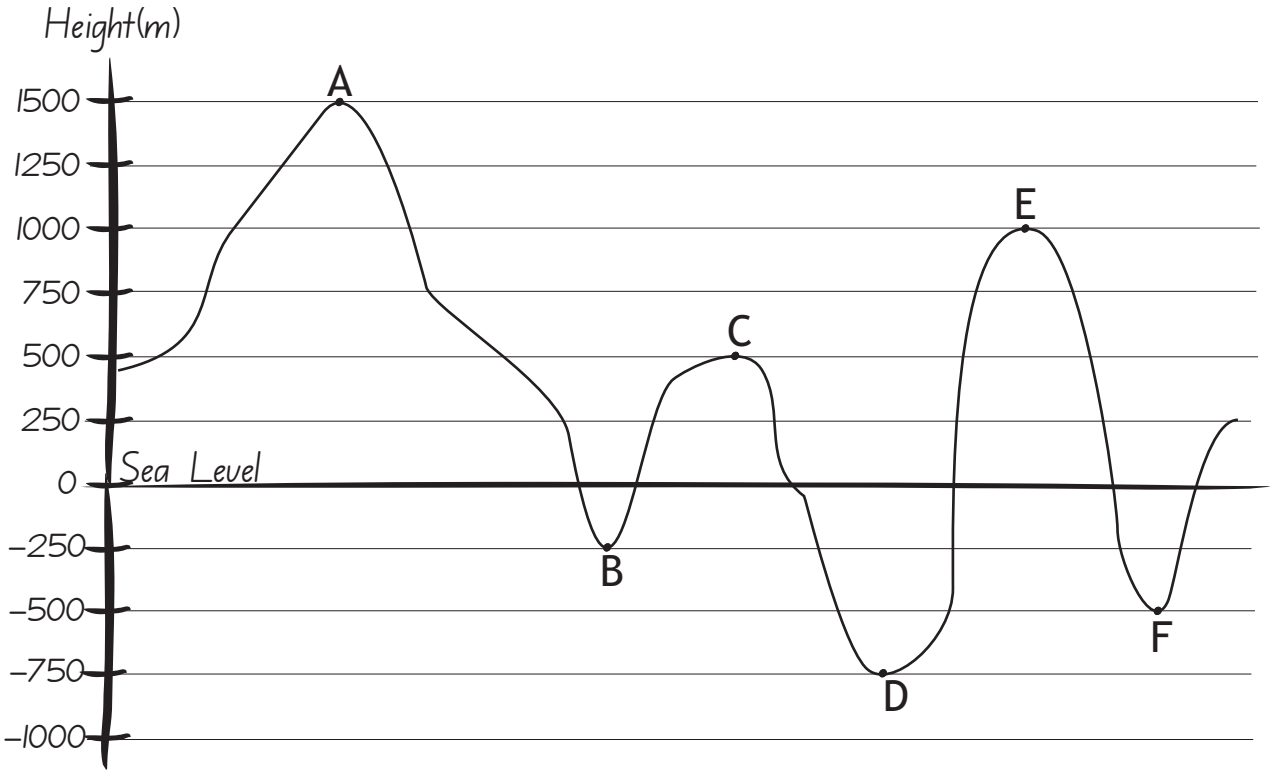
The temperature is more than -2°C but less than 5°C.

{ _____ }

The temperature is less than 6°C but more than -3°C.

{ _____ }

The diagram below is a geological cross-section. Write the heights of the mountains and the depths of the bottom of the sea.



A:	B:	C:	D:	E:	F:

Write the heights in increasing order.

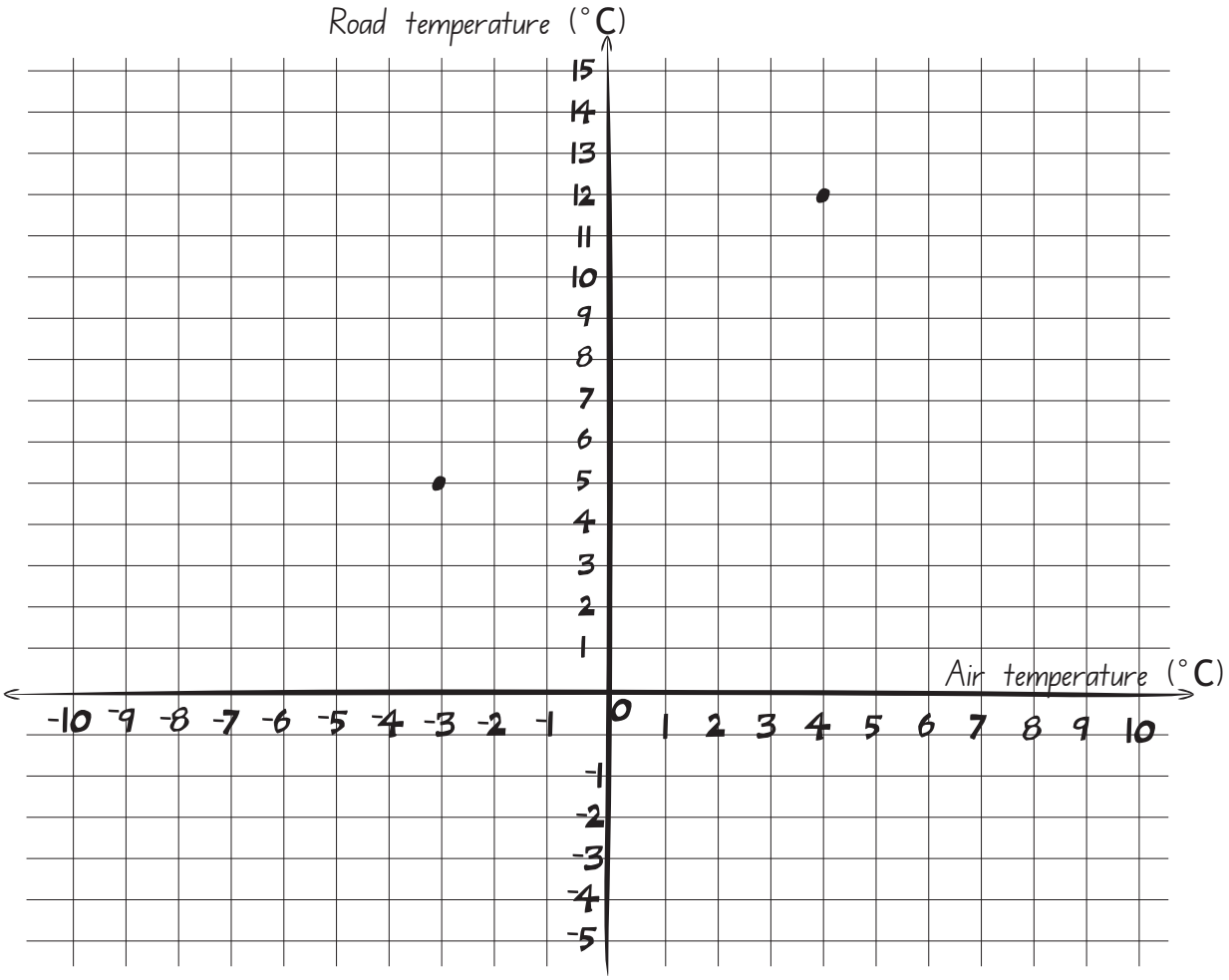
_____

Fill in the middle box with a greater than (>) or less than (<) sign. Write the difference between each number.

120 ☐ 50	-10 ☐ 90	-30 ☐ 30
_____	_____	_____
-70 ☐ 20	-15 ☐ -45	-50 ☐ 0
_____	_____	_____

The black surface of a road absorbs the sun's heat and becomes hotter than the air temperature. James has found that the road's surface is always 8°C hotter than the air temperature.
Complete the table to show what the two temperatures could be.
Plot the data by drawing dots on the graph.

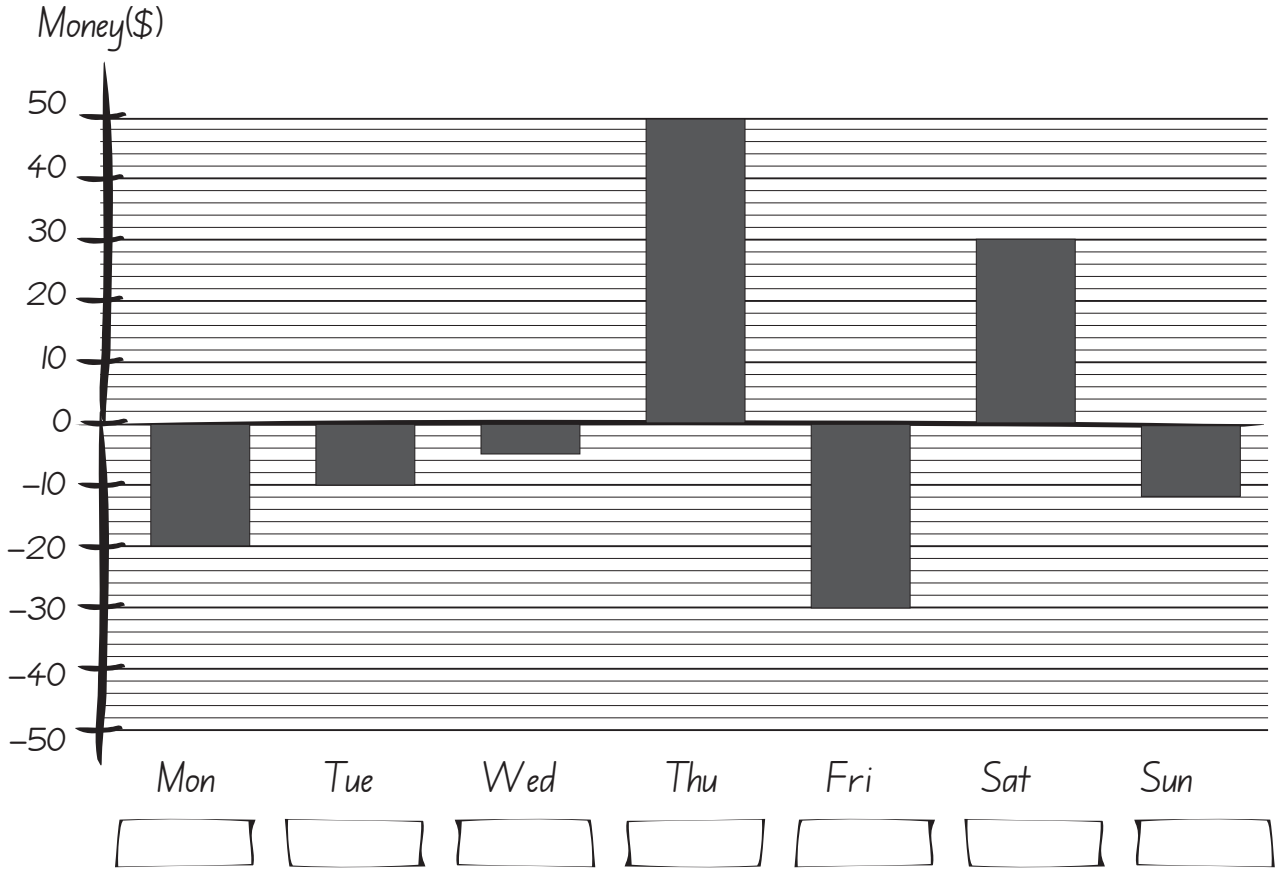
Air temperature (°C)	0	-4	-8	2					6	-3		5	
Road temperature (°C)					2	14	-1	7			0		1



Each day a hotel receptionist has to write down the number of guests arriving and departing. Complete the bottom row of the table to show an increase or decrease of guests staying at the hotel each day.

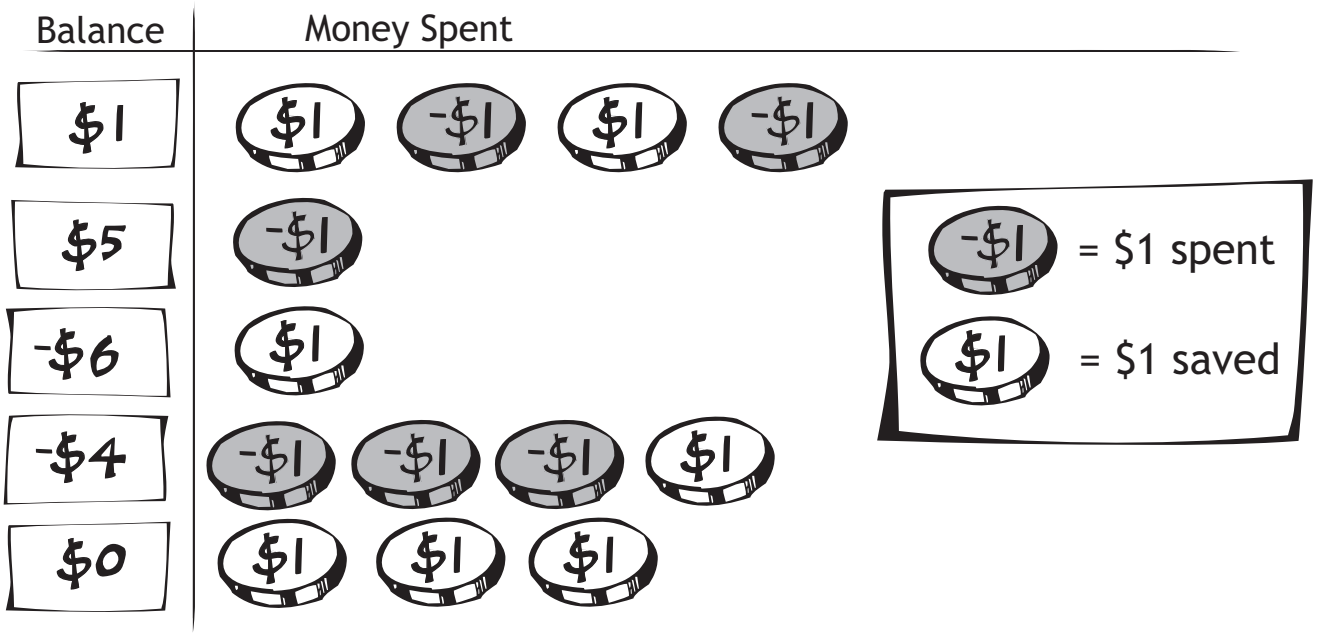
Arrive	25	22	15	0	21	7	1	9	18	4	16	20
Depart	18	20	18	4	24	1	5	18	17	12	19	11
Change	+7		−3									

The graph shows Jake's income (+) and spending (-) last week.
In the boxes below write how much he earned or spent each day.



How much did Jake save last week? ____

Complete the diagrams so that the money is equal to each balance.



INTEGERS

Integers are similar to whole numbers. The main difference is that there are negative integers and positive integers.

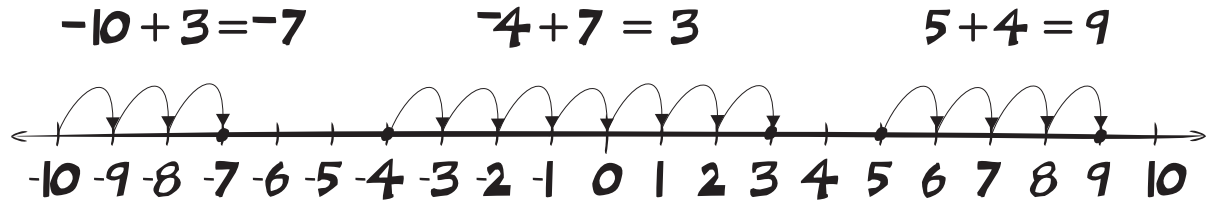
Integers become larger as you move to the right.

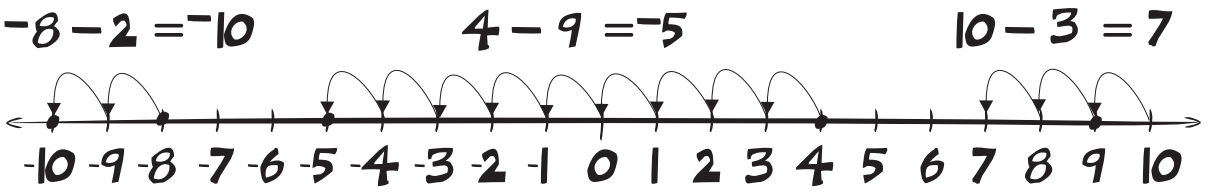
Negative integers are found on the left of zero and positive integers are found on the right of zero. Zero is neither positive or negative. Sometimes a positive integer has a + sign beside it but usually it has no sign at all. As you move along the number line to the right the integers become greater (larger). This means 1 > -10.

Write >, = or < between the two integers.

2 ☐ 9	8 ☐ 5	-4 ☐ 7	3 ☐ -3
0 ☐ 6	-9 ☐ -3	5 ☐ -8	-5 ☐ -5
4 ☐ -6	-1 ☐ 0	7 ☐ -2	-2 ☐ 0
-6 ☐ 1	2 ☐ 2	-2 ☐ -6	-7 ☐ -3

You add and subtract integers the same as any other number.





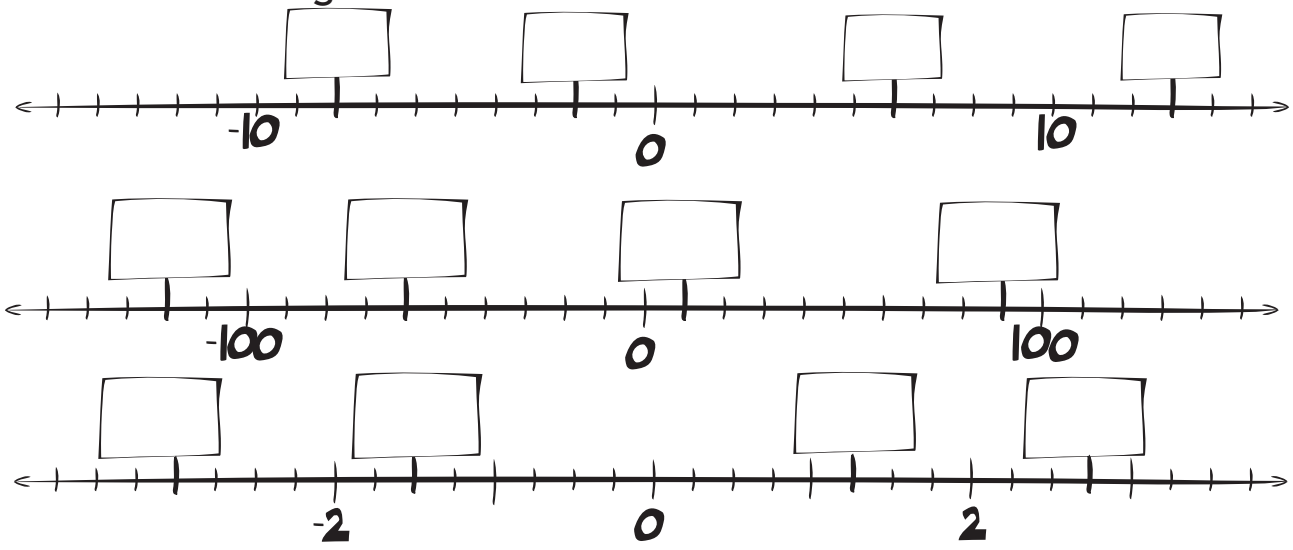
Use the number line to work out the answers to these sums.

$-4 + 7 =$	$-8 + 3 =$	$-1 + 5 =$
$-3 + 5 =$	$-2 + 2 =$	$-4 + 7 =$
$-8 + 6 =$	$-5 + 9 =$	$-3 + 11 =$
$-9 + 8 =$	$-8 + 14 =$	$-15 + 8 =$
$-12 + 15 =$	$-2 + 12 =$	$-1 + 15 =$
$-10 + 22 =$	$-7 + 12 =$	$-6 + 13 =$
$0 + 13 =$	$-15 + 4 =$	$-10 + 6 =$
$12 + 6 =$	$-10 + 1 =$	$-5 + 2 =$

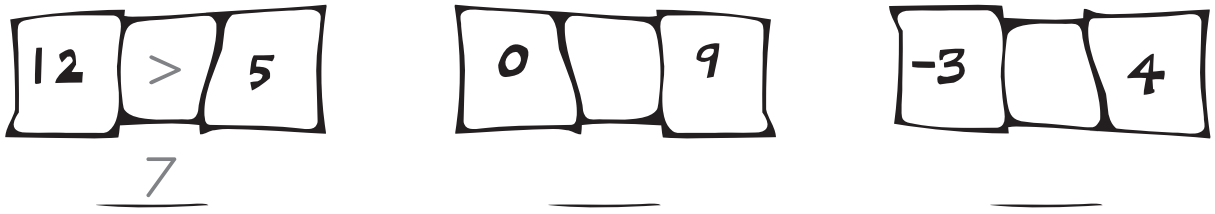
$13 - 9 =$	$8 - 10 =$	$-6 - 6 =$
$-7 - 4 =$	$6 - 13 =$	$-12 - 15 =$
$-2 - 7 =$	$8 - 16 =$	$4 - 14 =$
$7 - 12 =$	$-7 - 8 =$	$12 - 25 =$
$1 - 15 =$	$15 - 19 =$	$-1 - 0 =$
$10 - 8 =$	$2 - 9 =$	$8 - 14 =$

INTEGERS

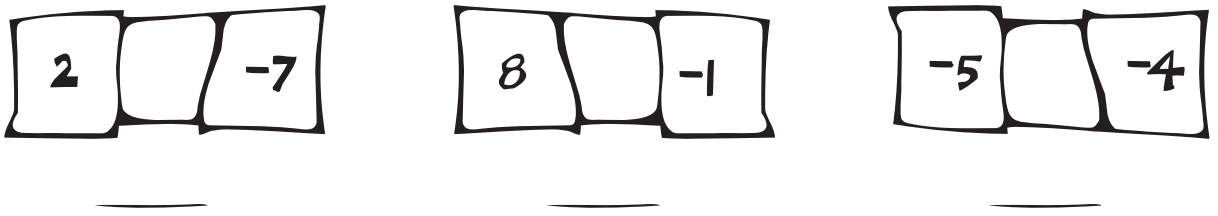
Fill in the missing numbers.



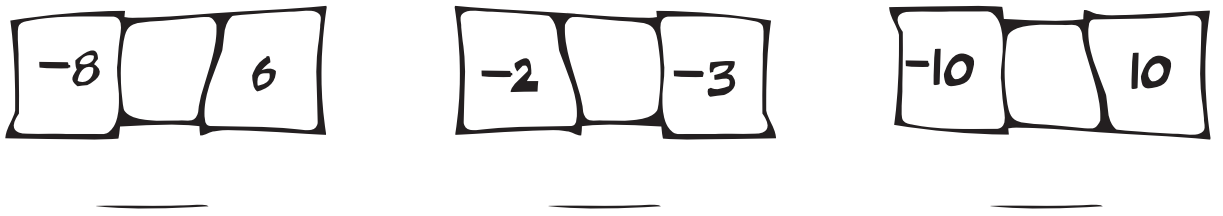
Fill in the middle box with a greater than (>) or less than (<) sign.
Write the difference between each number.



7 ____ ____



____ ____ ____



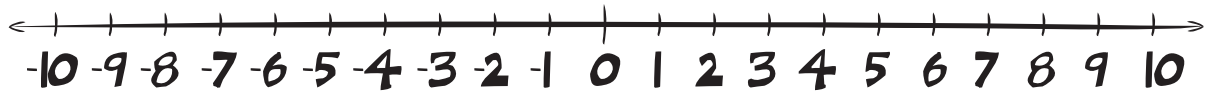
____ ____ ____

Continue the sequences for 3 terms (in both directions).

____ , ____ , ____, -6, -3, 0, 3, 6, ____ , ____ , ____

____ , ____ , ____, -8, -2, 4, 10, ____ , ____ , ____

INTEGER OPPOSITES



When you add integer opposites the result is always zero.
Add these integer opposites.

$-2 + 2 =$ ____ $-4 + 4 =$ ____ $-7 + 7 =$ ____

$2 + (-2) =$ ____ $4 + (-4) =$ ____ $7 + (-7) =$ ____

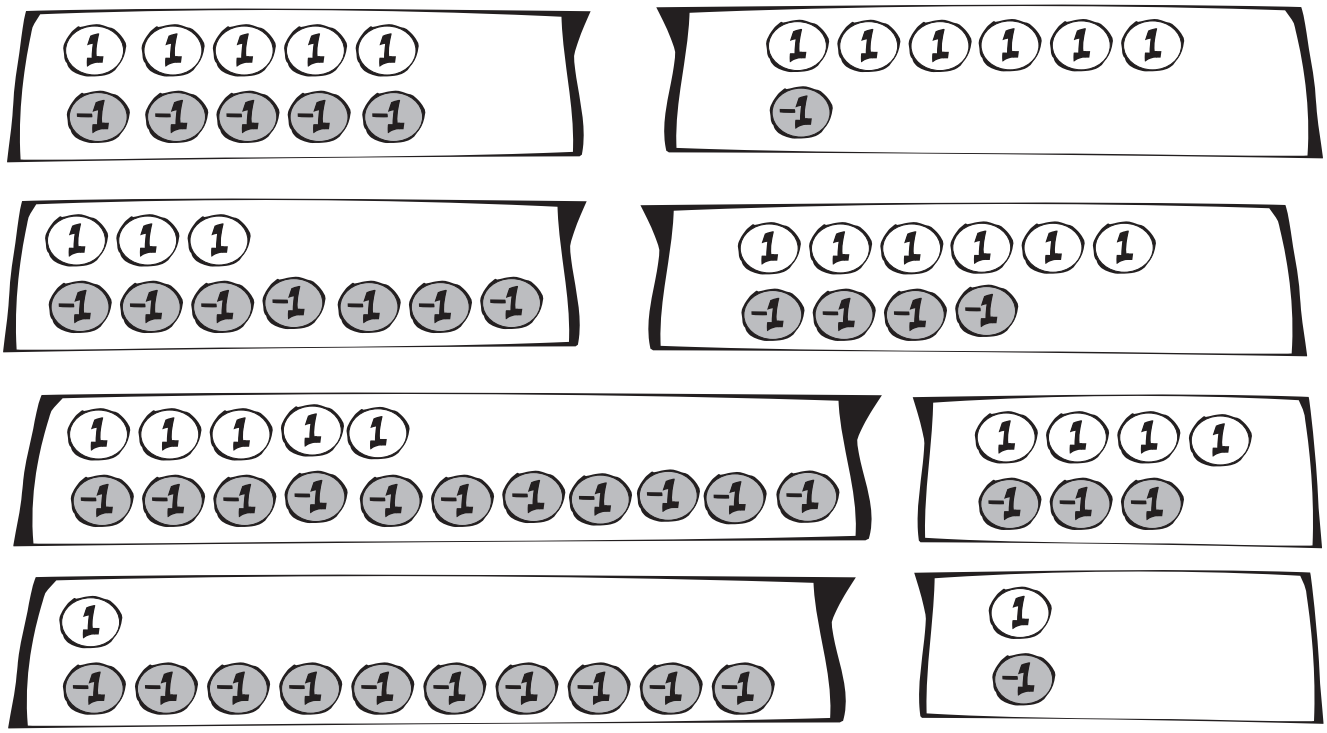
$-9 + 9 =$ ____ $9 + (-9) =$ ____ $-5 + 5 =$ ____

Use the adding integer rule to add these add these integers.

$-3 + 5 + 3 =$ ____ $-6 + 8 + 6 =$ ____

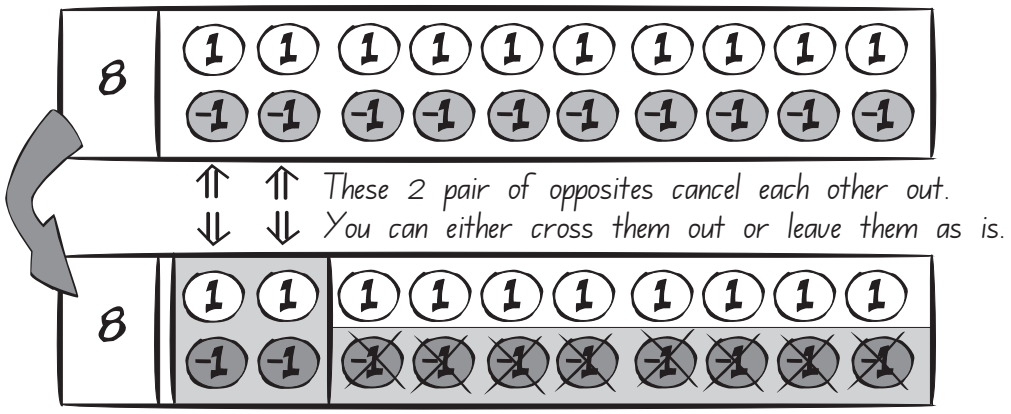
$-1 + 4 + 1 =$ ____ $-9 + 7 + 9 =$ ____

What do these diagrams represent? Remember, integer opposites sum to equal zero. Therefore If you have the same number of 1s as -1s then you have zero.



INTEGER OPPOSITES

When you add integer opposites the result is always 0 (zero).
Cross out the 1s (1) or the -1s (-1) to illustrate the number shown.
The first one is done for you.



4

-1

5

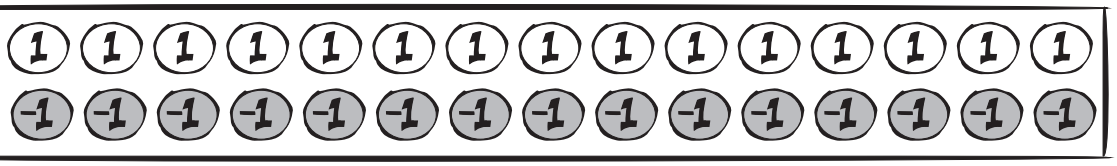
-3

6

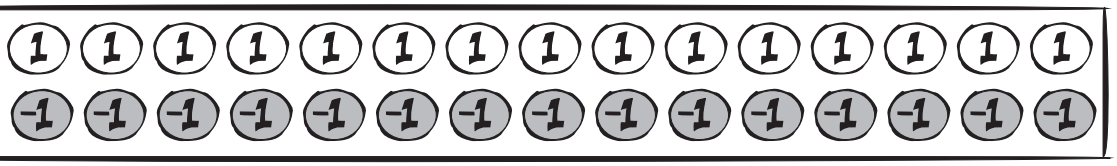
-2

Cross out the 1s (1) or the -1s (-1) to illustrate the number shown.

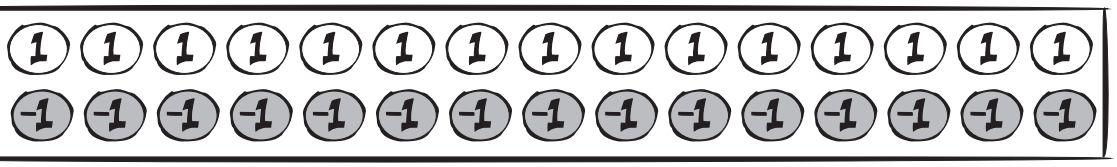
-10



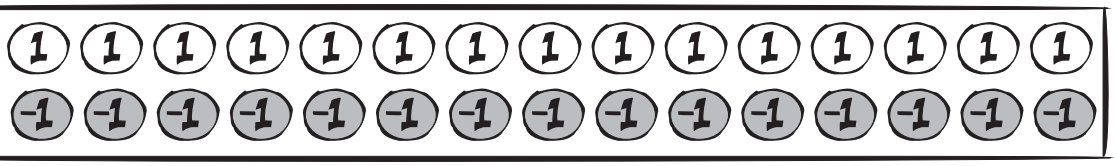
15



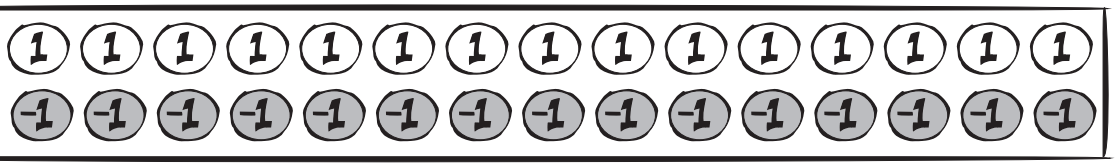
-1



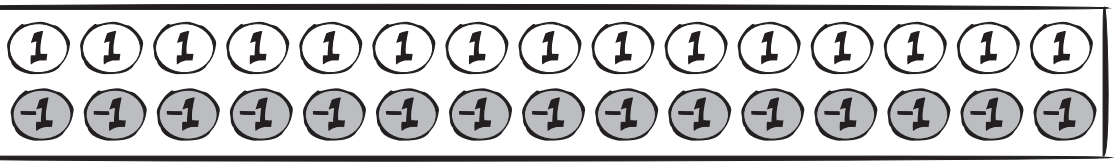
-9



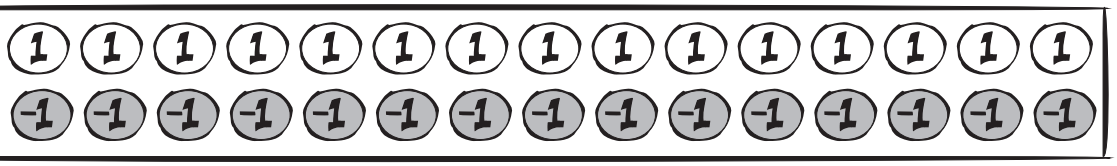
-14



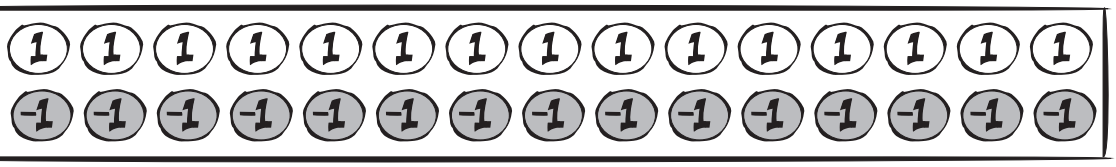
-13



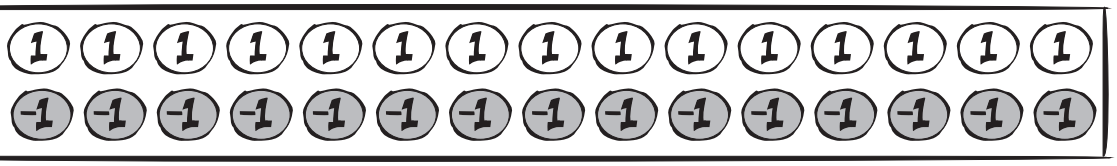
-11



-7

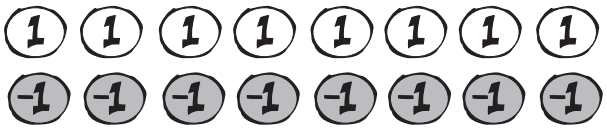


12

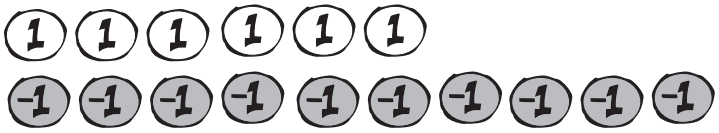


INTEGER ARITHMETIC

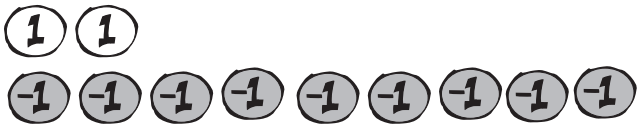
Use the diagrams to help add these integers - remember, integer opposites sum to equal zero. If you have the same number of 1s as -1s then you have zero.



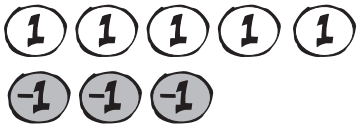
$8 + (-8) =$ ____



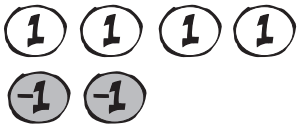
$6 + (-10) =$ ____



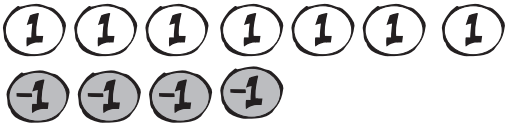
$2 + (-9) =$ ____



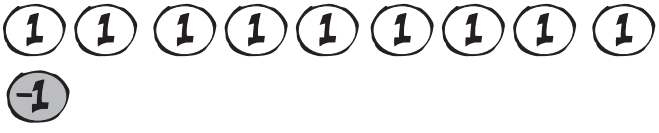
$5 + (-3) =$ ____



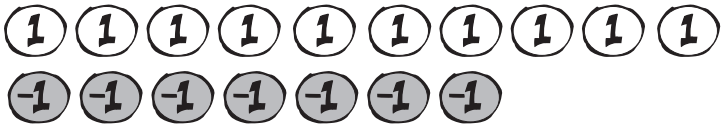
$4 + (-2) =$ ____



$7 + (-4) =$ ____

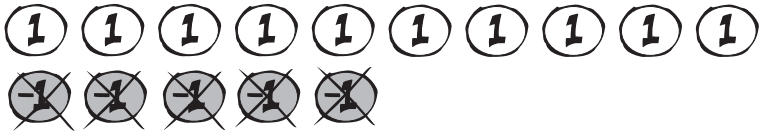


$9 + (-1) =$ ____

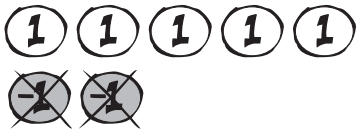


$10 + (-7) =$ ____

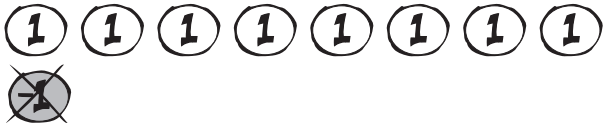
Use the diagrams to help subtract these NEGATIVE integers. Remember, integer opposites sum to equal zero. If you have the same number of 1s as -1s then you have zero.



$5 - (-5) =$ ____



$3 - (-2) =$ ____



$7 - (-1) =$ ____

$6 - (-3) =$ ____

$-4 - (-4) =$ ____

$-7 - (-1) =$ ____

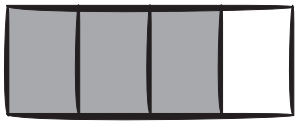
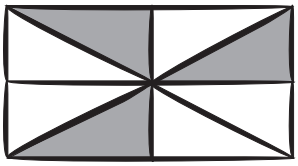
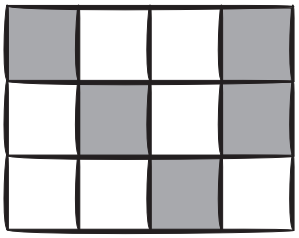
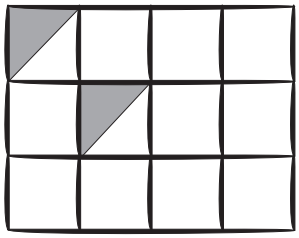
$-11 - (-4) =$ ____

$-8 - (-6) =$ ____

$-5 - (-2) =$ ____

FRACTIONS

What fraction is shaded?

Put in a > or < symbol.

$\frac{1}{4} \bigcirc \frac{1}{8}$ $\frac{2}{7} \bigcirc \frac{5}{21}$ $\frac{10}{12} \bigcirc \frac{7}{6}$

Calculate:

One half of 18

One quarter of 20.

One third of 90.

Two thirds of 90.

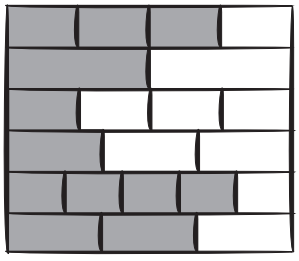
One fifth of 100.

Three fifths of 100.

Put these fractions in order smallest to largest.

$\frac{4}{5}$ $\frac{2}{5}$ $\frac{5}{5}$ $\frac{1}{5}$

$\frac{3}{4}$ $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{3}$ $\frac{4}{5}$ $\frac{2}{3}$



DECIMALS

Write the correct statement beside the decimal.

"Just a bit bigger than 50", "Almost 51", "Midway between 50 & 51"

50·5 _____

50·2 _____

50·7 _____

Write the following as decimal numbers:

Two point eight _____

Twenty seven point nine _____

Thirteen point five _____

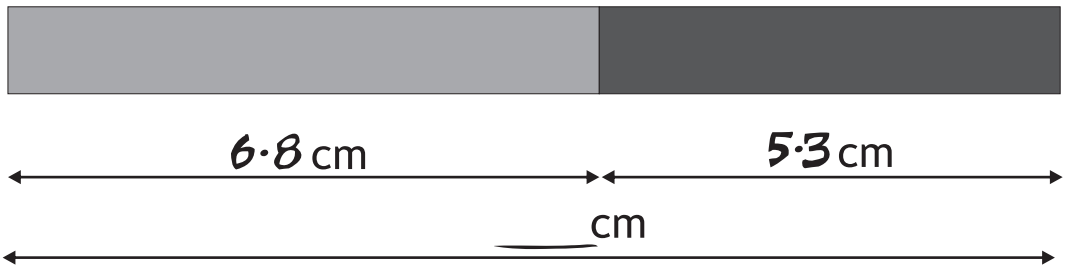
One tenth _____

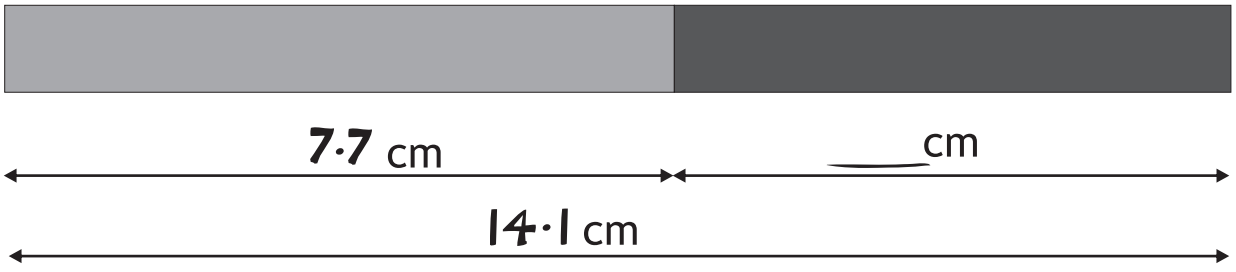
$\frac{1}{2}$ _____

$\frac{3}{4}$ _____

$\frac{2}{5}$ _____

Find the missing lengths.





PERCENTAGES %

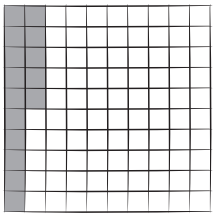
A fraction with a denominator of 100 is easier to write as a percent.

Ten percent $\frac{10}{100} = 10\%$

Twenty five percent $\frac{25}{100} = 25\%$

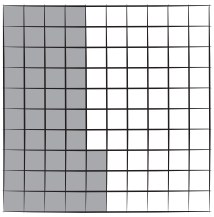
Eighty three percent $\frac{83}{100} = 83\%$

What part of each square is shaded? Write your answer as a fraction over 100 and also as a number with a percent sign.



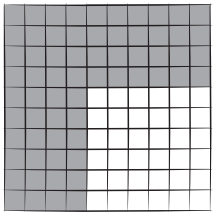
Fraction:

Percent:



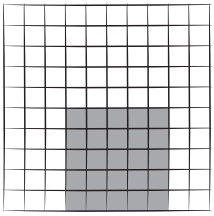
Fraction:

Percent:



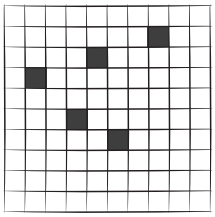
Fraction:

Percent:



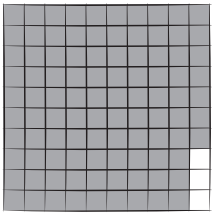
Fraction:

Percent:



Fraction:

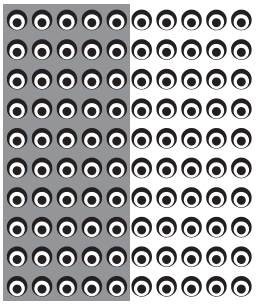
Percent:



Fraction:

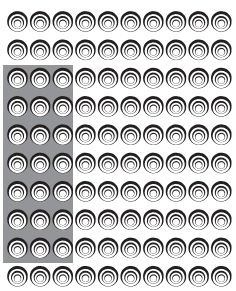
Percent:

What part of each group is shaded? Write your answer as a fraction over 100 and also as a number with a percent sign.



Fraction:

Percent:



Fraction:

Percent:

Complete each sentence. The first is done for you.

15% means . .15. .out . of . 100 . As a fraction it is written . . $\frac{15}{100}$ . .

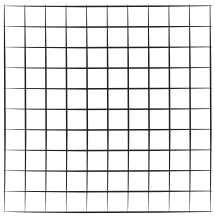
27% means . . . . . As a fraction it is written . . . . . .

50% means . . . . . As a fraction it is written . . . . . .

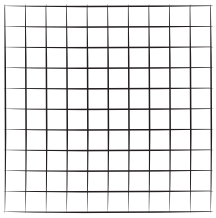
75% means . . . . . As a fraction it is written . . . . . .

Each of the large squares below is divided into ..... small squares.

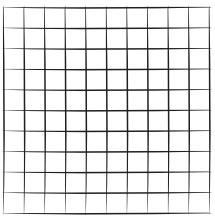
Shade 10%



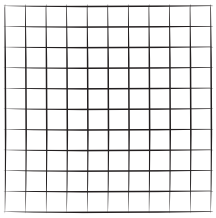
Shade 75%



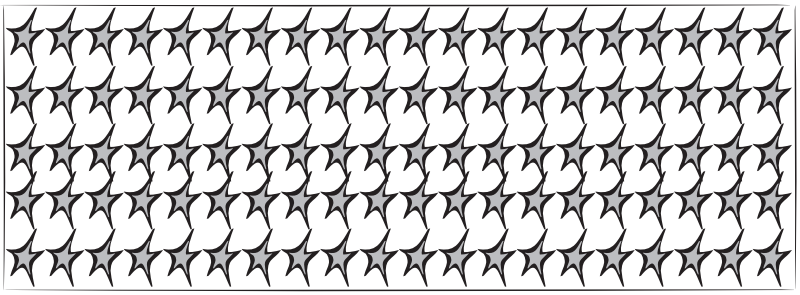
Shade 1%



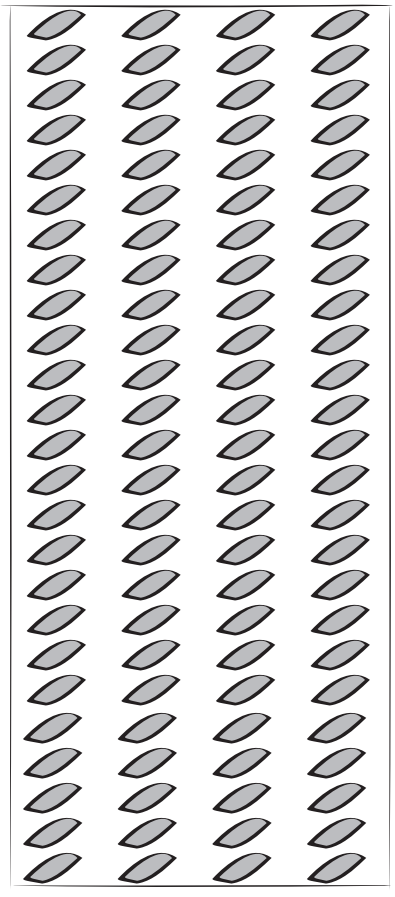
Shade 100%



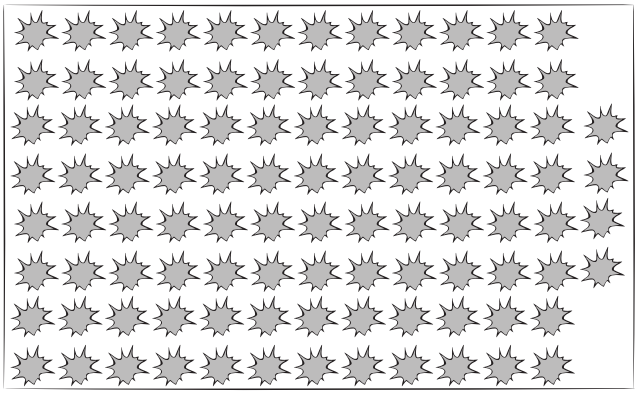
There are 100 ☆. Circle 80%.



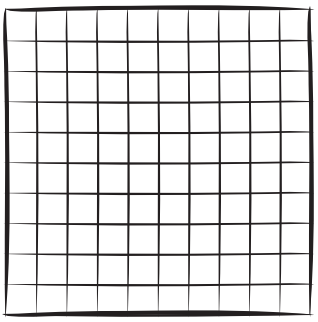
There are 100 . Circle 33%.



There are 100 . Circle 12%



POPULAR PERCENTS %

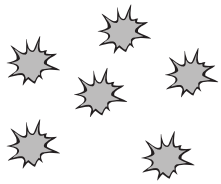


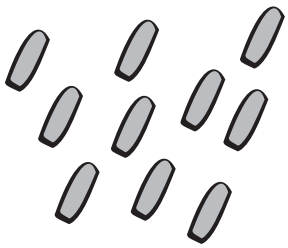
Shade one half of the large square.

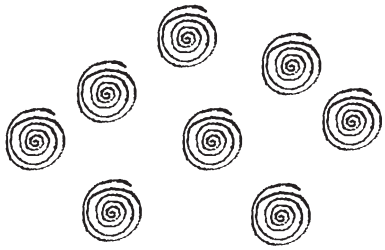
What percent is shaded? ..... %

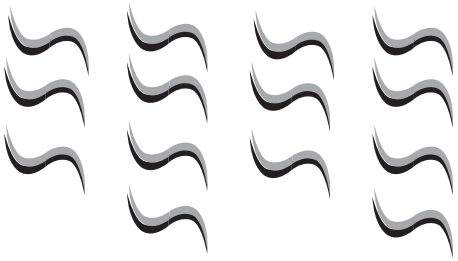
One half of something means ..... % of it.

Circle 50% of each group of shapes.

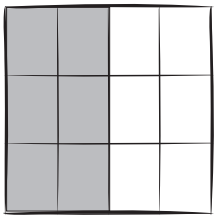


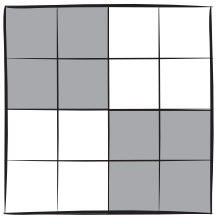


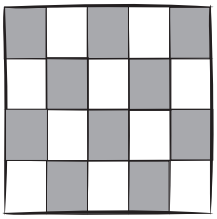




For each of the three squares below answer the questions.





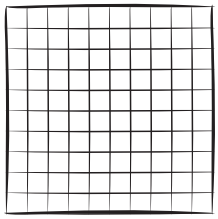


The square is divided into: _____ _____ _____

How many divisions are shaded? _____ _____ _____

What percentage is shaded? _____ _____ _____

A Quick Rule:
To find 50% of a number divide by: _____



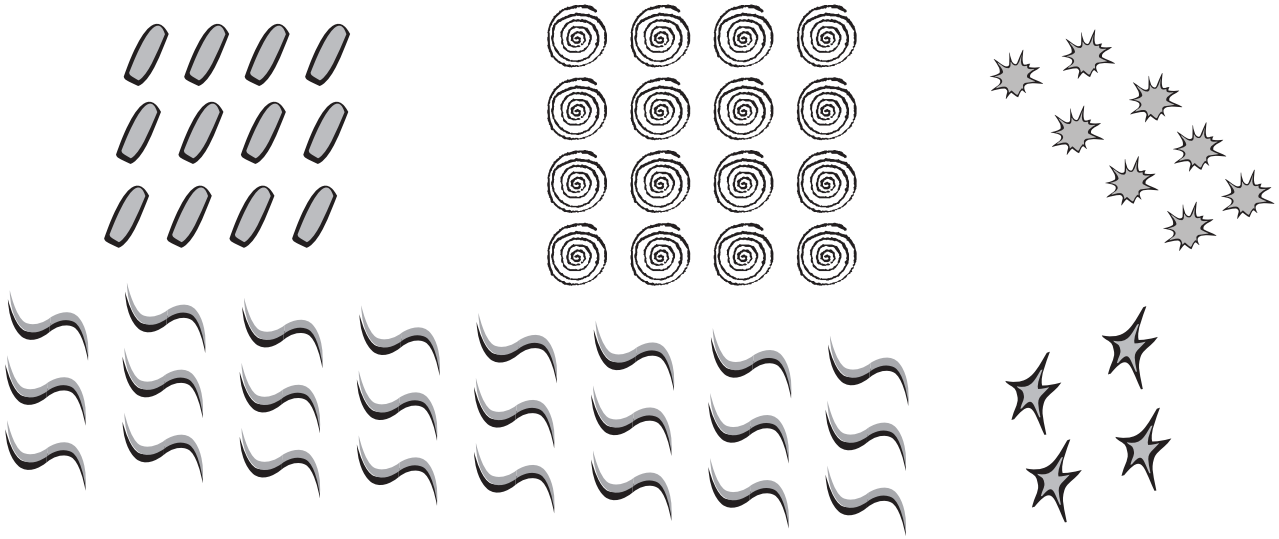
Shade one fourth of the large square.

What percent is shaded? ..... %

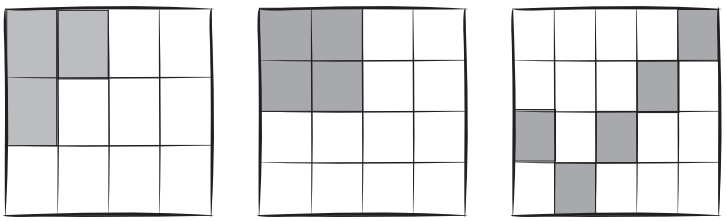
One fourth is also referred to as one Q.....

One quarter of something means ..... % of it.

Circle 25% of each group of shapes.



For each of the three squares below answer the questions.



The square is divided into: _____ _____ _____

How many divisions are shaded? _____ _____ _____

What percentage is shaded? _____ _____ _____

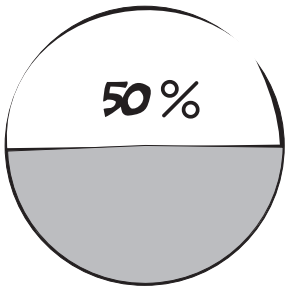
A Quick Rule:
To find 25% of a number divide by: _____

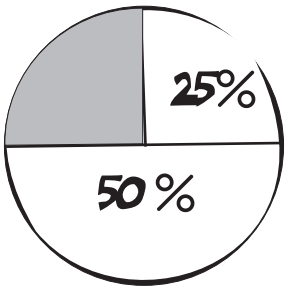
MORE PERCENTAGES %

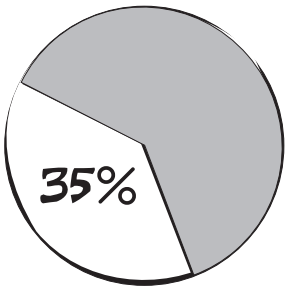
All of something means ..... % of it.

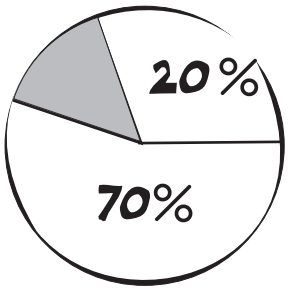
A "pie chart" is a useful way to show statistical information. It is divided into pie slices. The complete circle is 100%.

Fill in the missing (shaded) percent for each pie chart below.









Complete the table below (the first column is done for you):

100%	28	80				
50%	14		100	16		
25%	7				3	15

Solve each problem below.

50% of 30 is _____

25% of 40 is _____

50% of 92 is _____

25% of 56 is _____

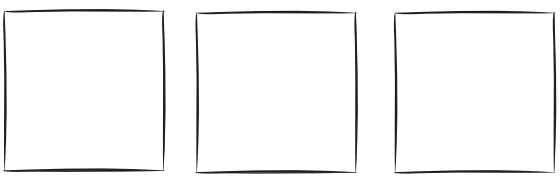
12 is 50% of _____

3 is 25% of _____

19 is 50% of _____

10 is 25% of _____

Shade 100% of these squares:



If you were asked to draw 200% of these squares how many would you draw? _____

SQUARES & SQUARE ROOTS

Squares - multiply the number by itself.
Square Roots - what multiplies by itself to give that number?

5^2 ← 5 squared means $5 \times 5 = 25$

10^2 means $10 \times 10 = 100$

$\sqrt{36}$ ← The square root of 36 $= 6$ because $6 \times 6 = 36$

$\sqrt{64} = 8$ because $8 \times 8 = 64$

Calculate these squares and square roots.

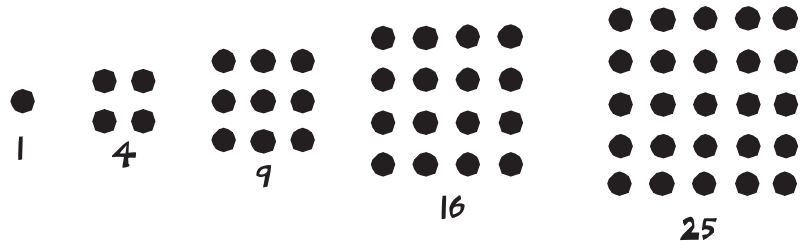
$2^2 =$ $\quad 7^2 =$ $\quad 9^2 =$

$7^2 =$ $\quad 11^2 =$ $\quad 13^2 =$

$\sqrt{49} =$ $\quad \sqrt{144} =$ $\quad \sqrt{16} =$

$\sqrt{25} =$ $\quad \sqrt{100} =$ $\quad \sqrt{81} =$

Square Numbers



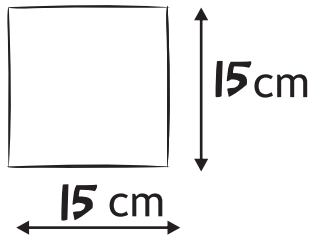
The first 5 square numbers are: 1 4 9 16 25
Each is found by squaring the numbers: 1 2 3 4 5

Write the first 15 square numbers.

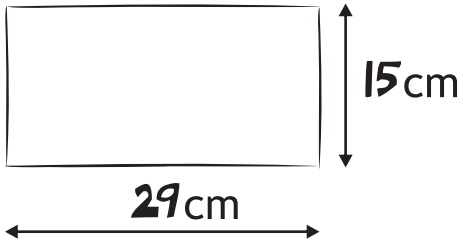
PERIMETER

Calculate the perimeters of these shapes.
(The shapes are not drawn to scale.)

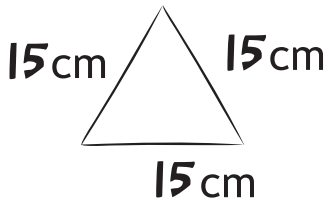
Square



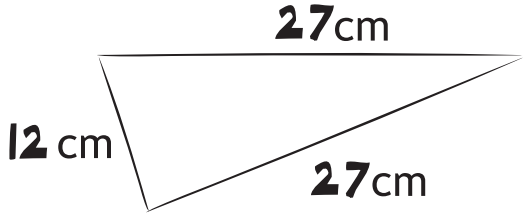
Rectangle



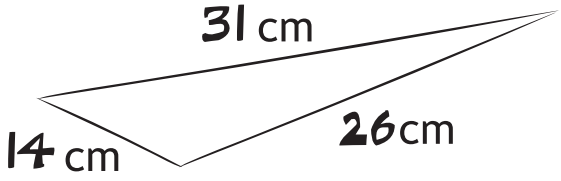
Equilateral Triangle



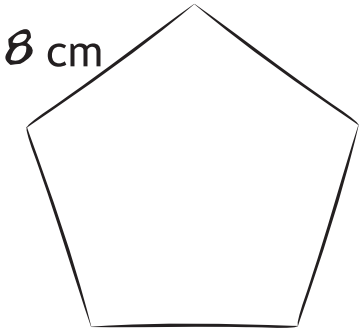
Isosceles Triangle



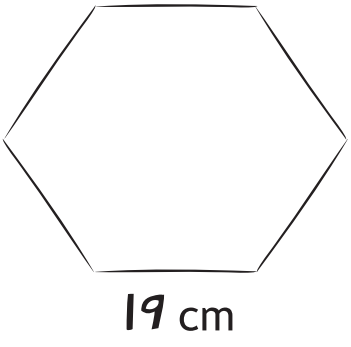
Scalene Triangle



Regular Pentagon

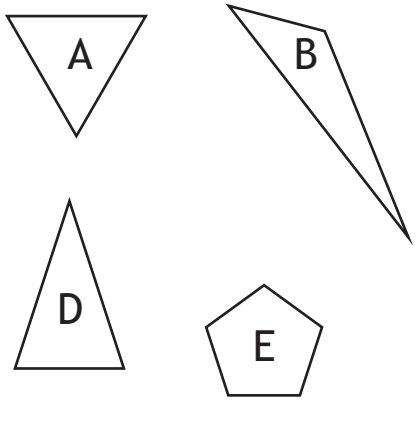


Regular Hexagon



SHAPES

Write the correct name for each shape from the list.



Equilateral Triangle
Hexagon
Octagon
Scalene Triangle
Heptagon
Right Angled Triangle
Pentagon
Isosceles Triangle

A _____

B _____

C _____

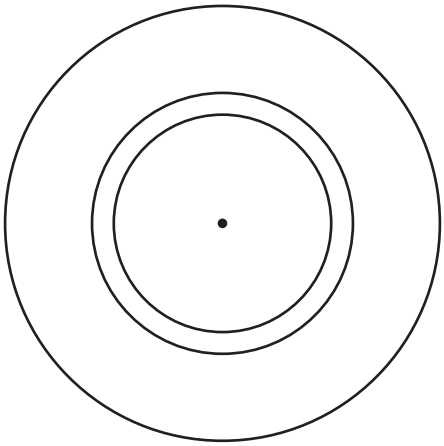
D _____

E _____

F _____

G _____

H _____



Write these measurements:

Smallest circle

Diameter= _____ Radius= _____

Middle circle

Diameter= _____ Circumference= _____

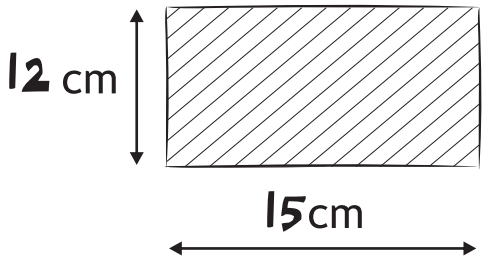
Largest circle

Radius = _____ Circumference= _____

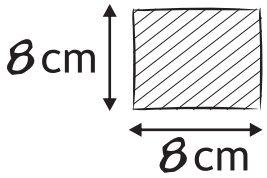
Hint: You many need a piece of string to measure the circumference.

AREA

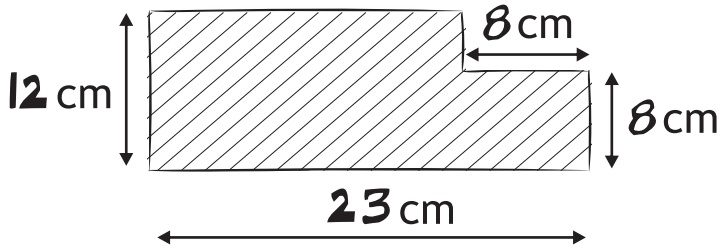
Calculate the shaded areas of each shape.
The shapes are not drawn to scale.



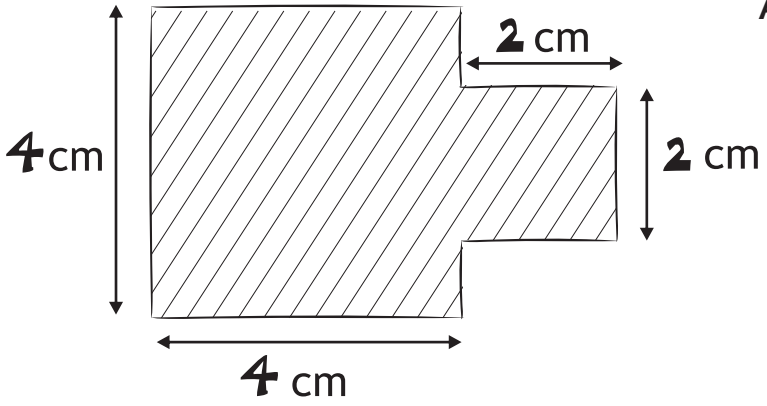
Area =



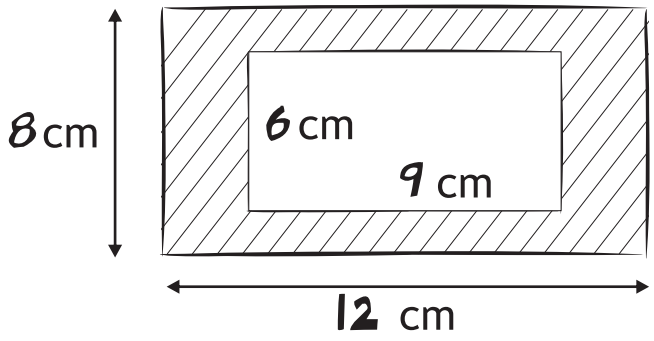
Area =



Area =



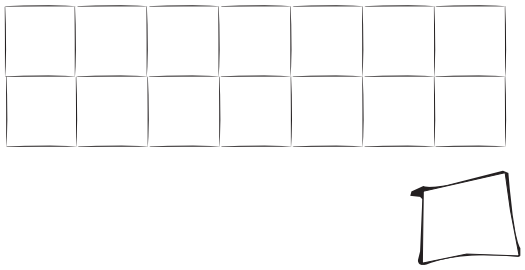
Area =



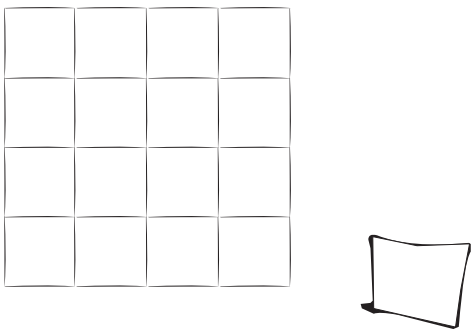
AREA

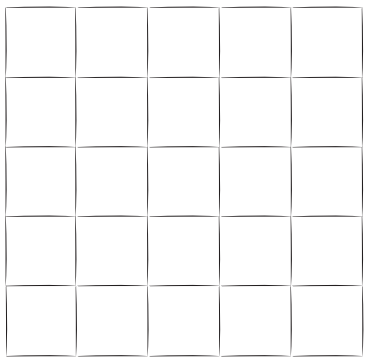
or

Which of each pair has the larger area?

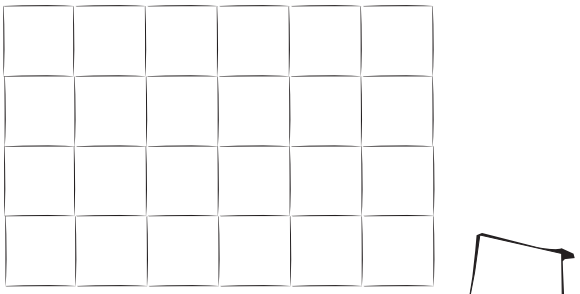


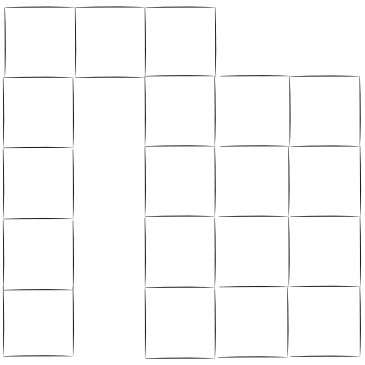
or



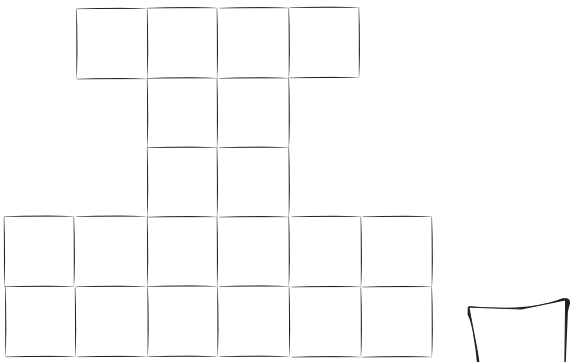


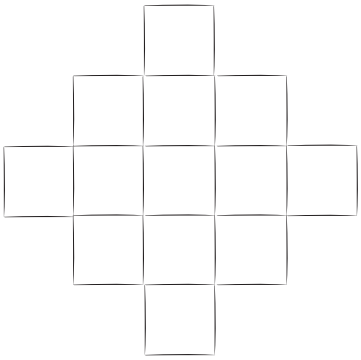
or



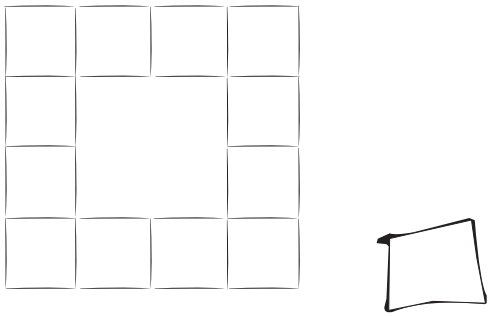


or





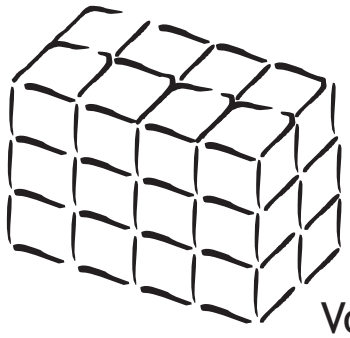
or



VOLUME

The ..... of a solid is the amount of space inside it. It is calculated by multiplying length, width and height. If all the measurements are in cm then the volume is measured in cubic centimetres (abbreviated to cm^3).

If the shapes below are made of 1 cm cubes, determine the volumes.

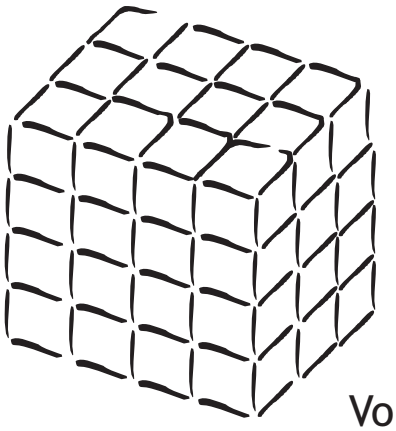


Length = _____ cm

Width = _____ cm

Height = _____ cm

Volume = _____ × _____ × _____ = _____ cm^3

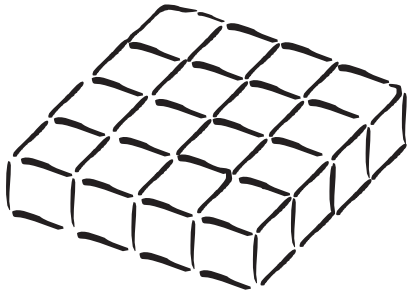


Length = _____ cm

Width = _____ cm

Height = _____ cm

Volume = _____ × _____ × _____ = _____ cm^3



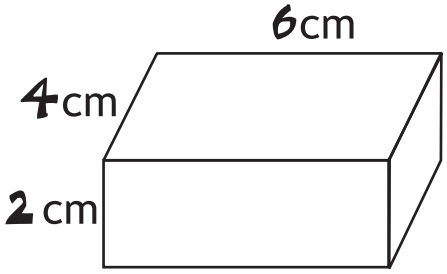
Length = _____ cm

Width = _____ cm

Height = _____ cm

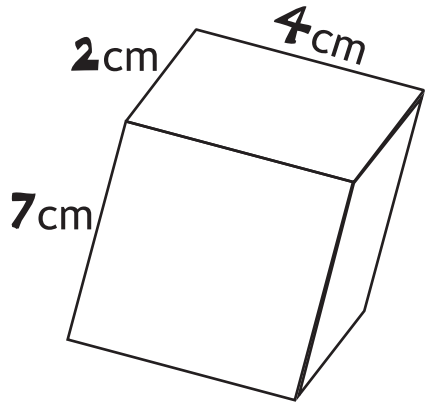
Volume = _____ × _____ × _____ = _____ cm^3

Calculate the volume of the following rectangular prisms.
The prisms are <u>not</u> drawn to scale.



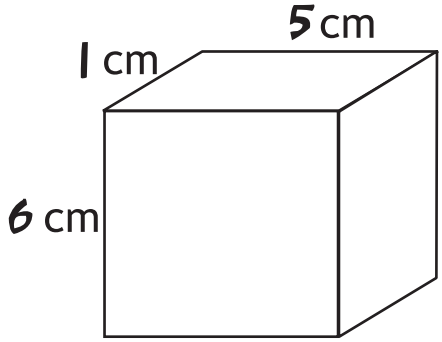
Volume = _____ × _____ × _____

= _____ cm^3



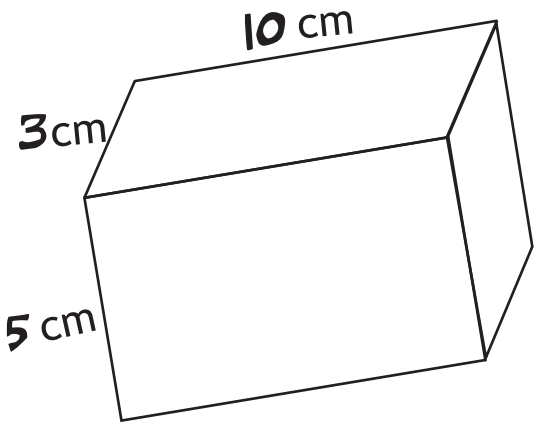
Volume = _____ × _____ × _____

= _____ cm^3



Volume = _____ × _____ × _____

= _____ cm^3



Volume = _____ × _____ × _____

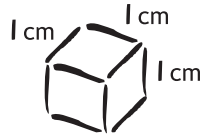
= _____ cm^3

VOLUME

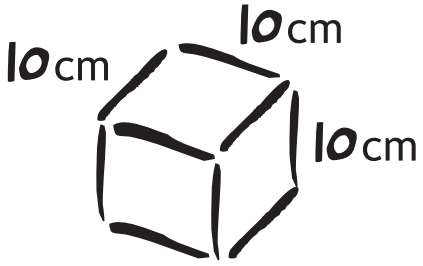
Complete the table below.

Length	Width	Height	Volume
5 cm	1 cm	7 cm	cm^3
6 cm	5 cm	cm	210 cm^3
7 cm	cm	3 cm	63 cm^3
cm	2 cm	2 cm	32 cm^3
cm	7 cm	4 cm	252 cm^3
10 cm	5 cm	cm	300 cm^3
12 cm	cm	5 cm	480 cm^3

The volume of a solids are usually measured in cm^3
Volumes of liquids are measured in mL (millilitres) or L (litres).
The following example shows how to convert mL to L and cm^3 to m^3



$1\text{ cm} \times 1\text{ cm} \times 1\text{ cm} = 1\text{ cm}^3$
$= 1$ mL (millilitre)

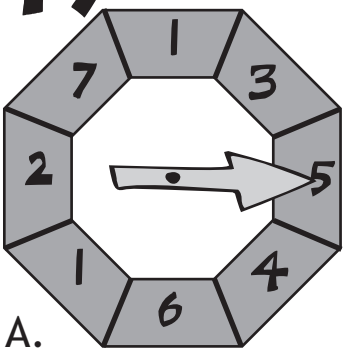


$10\text{ cm} \times 10\text{ cm} \times 10\text{ cm} = 1000\text{ cm}^3$
$= 1$ L (litre)

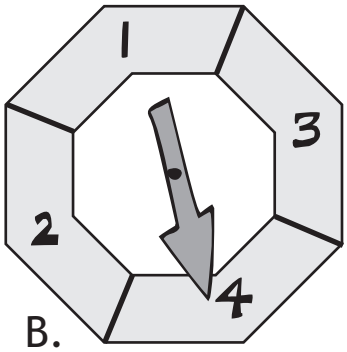
1m = 100cm
$\therefore 100\text{cm} \times 100\text{cm} \times 100\text{cm} = 1000\,000\text{ cm}^3$
$= 1000\,000$ mL
$= 1000$ L

PROBABILITY

Greta has two spinners.



A.



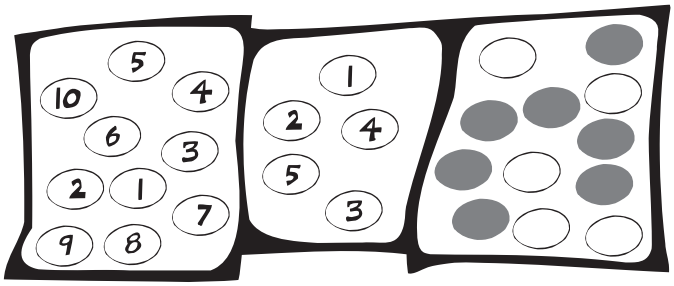
B.

What is the probability of spinning a "5" on Spinner A?
Write your answer as a fraction. _____

Greta says "I am equally likely to spin a 1 on Spinner A as on Spinner B". Is Greta correct? Explain your answer.

_____

_____



Tin A Tin B Tin C

What is the probability:

Of getting a 3 out of Tin A? _____

Of getting an odd number out of Tin B? _____

Of getting a grey ball out of Tin C? _____

If you wanted a Number 5 ball would you be more likely to get it from Tin A or Tin B? Explain why.

_____

_____

PROBABILITY

Lauren, Kristen and Kyle each toss a coin several times and write their results in the table below. Complete the table.

Outcome	Lauren	Kristen	Kyle	Totals *(frequency)*	Ratio *(relative frequency)* Fraction	Decimal	Percentage
Head	49	33	24				
Tail	51	27	16				
			Total Tosses				

Toss a coin 20 times and note each result in the table below.

Outcome	Prediction	Toss Results 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Totals
Head																						
Tail																						

Statistics results are better analysed if there are many trials. Collect the data from 4 others who have done the same 20 coin toss experiment. Then fill in the table below. (You may have to do the experiment another 4 times).

Outcome	Toss Results 1	2	3	4	5	Totals *(frequency)*	Ratio *(relative frequency)* Fraction	Decimal	Percentage
Head									
Tail									

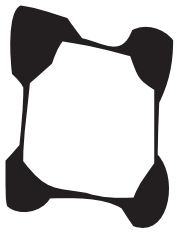
If you toss a coin are you more likely to get a Head or a Tail? Explain your answer.

Toss two coins 24 times and note how they each land on the table.

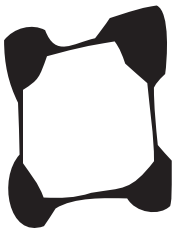
	Toss Results																								Totals
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
TT																									
TH																									
HT																									
HH																									

What fraction of the tosses resulted in:

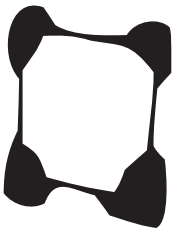
2 heads



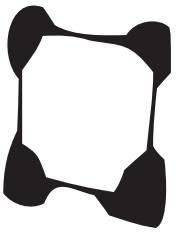
2 tails



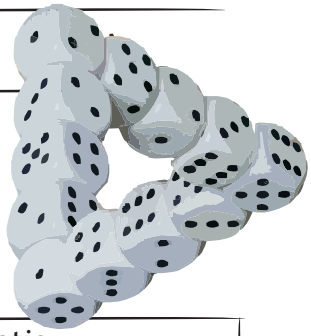
1 head and 1 tail



at least 1 tail



If you conducted the experiment again, would you expect the same results? Explain your answer.



Throw a dice 30 times and keep a tally of how it lands. Then complete the rest of the table below.

Outcome	Tally of 30 throws	Totals *(frequency)*	Ratio *(relative frequency)*		
			Fraction	Decimal	Percentage
					
					
					
					
					
					

PROBABILITY

Toss 3 different coins and note how they land in the table below. Repeat 24 times.

	Toss Results																								Totals
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
TTT																									
TTH																									
THT																									
THH																									
HTT																									
HTH																									
HHT																									
HHH																									

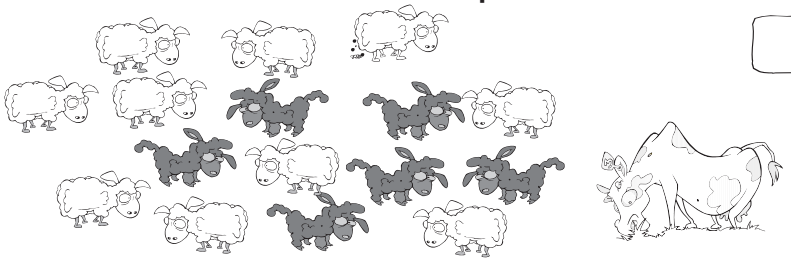
Statistics results are better analysed if there are many trials. Collect the data from 4 others who have done the same 24 times 3 coin toss experiment. Then fill in the table below.

Outcome	Toss Results					Totals *(frequency)*	Ratio (*relative frequency*)		
	1	2	3	4	5		Fraction	Decimal	Percentage
TTT									
TTH									
THT									
THH									
HTT									
HTH									
HHT									
HHH									

There are 6 black sheep and 10 white sheep in a flock.

What is the ratio of black sheep to white sheep? _____

What fraction of the sheep are black? $\frac{\square}{\square}$



In a bag there are 40 coloured balls. The balls are either black or white. The ratio of white to black balls is 1 : 3.

How many of each colour are there in the bag.

Black ball total = ☐ White ball total = ☐

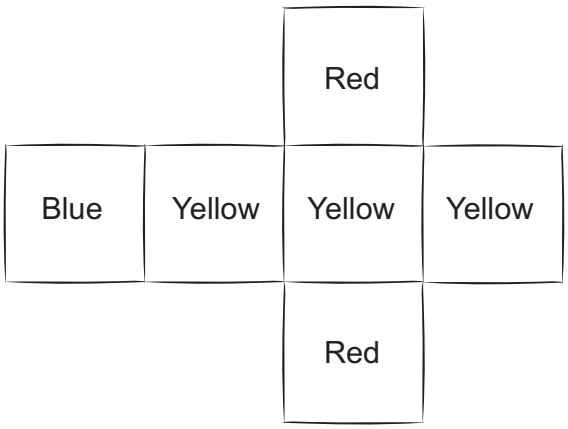
Nigel takes a ball out of the bag. What is the probability that it will be black and what is the probability that it will be white?

Probability of black ball = ☐ Probability of while ball = ☐

Imagine this net folded to make a cube and then rolled like a dice.

What is the probability that the red face will land facing upright?

Probability = ☐



What is the probability that the yellow face will land facing upright?

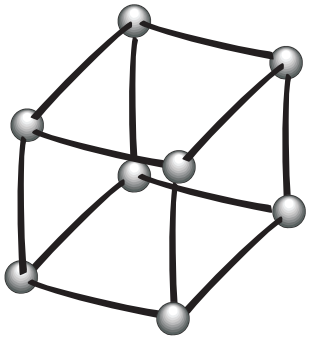
Probability = ☐

What is the probability that a colour other than blue will land facing upright?

Probability = ☐

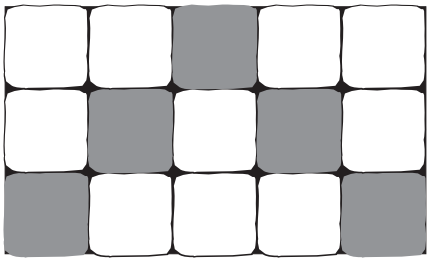
In a lottery 2 numbers are drawn from the balls above. List all the possible outcomes

A MIGHTY MATHS TEST



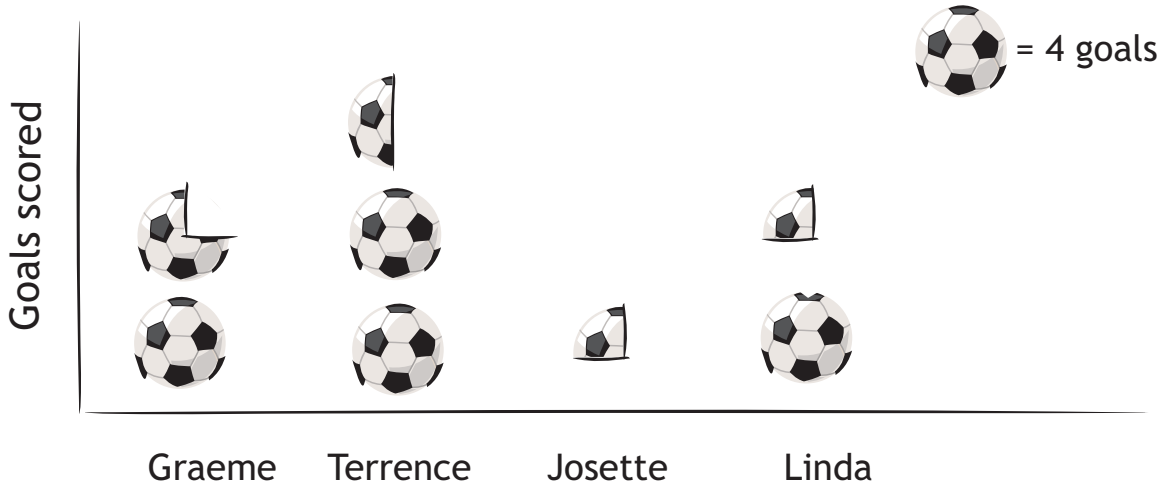
This model can be made using plastic balls and straws. How may balls and straws would you need to make the model?

_____



What fraction of this figure is shaded?

_____



The graph shows how many goals were scored by some players in the school football team in one season.
How many goals did each player score?

Graeme _____ Terrence _____

Josette _____ Linda _____

If you cut each of the three apples pictured into quarters how many quarters will you have in total?

_____

This shape is made up of 3 squares each with sides 3cm long. What is the perimeter and the area of the shape?

Area = _____ Perimeter = _____

Helen is saving to purchase a washing machine.
A new machine costs $800
Helen has saved $280.
How much more money does Helen need to purchase the washing machine?

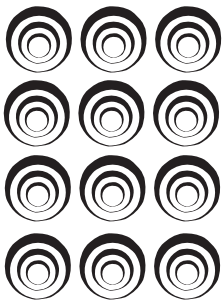
Amount needed: $ _____

Josh gets on the bus at 3:48 pm and gets off at 4:15 pm. How long is he on the bus?

Time on bus = _____

What is the hundreds value in the number 1657.4?

Value = _____



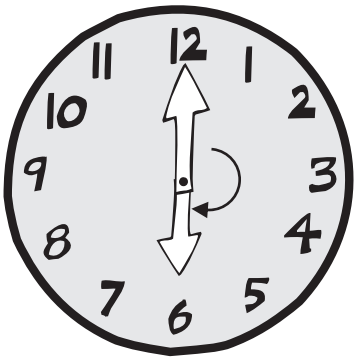
What is three quarters of twelve?

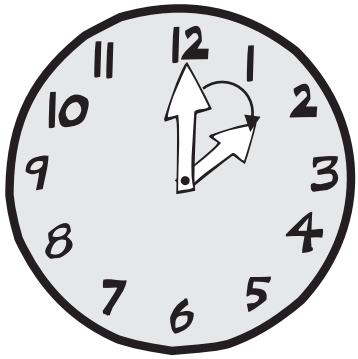
$\frac{3}{4}$ of 12 = _____

What is one quarter written as a decimal?

$\frac{1}{4}$ as a decimal = _____

Write down the time and angles formed on each clock.





Time _____ _____ _____

Angle _____ _____ _____

A loaf of bread is $1.90,
A bread stick is $0.75

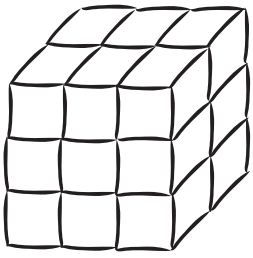
How much change would you get from $10 if you purchased 3 loaves of bread and 2 bread sticks

Change = $ _____

What operation is needed to make this sum true?

5 + 16 8 = 7

_____

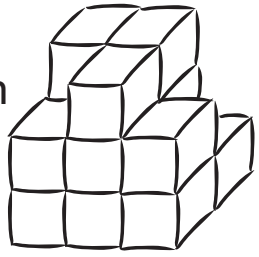


This shape is made of a number of 1cm cubes.
How many 1 cm cubes are needed to make the shape?

Number of cubes = _____

The shape has now had a number of 1 cm cubes taken from it. How many cubes were taken?

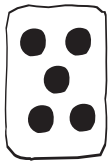
_____

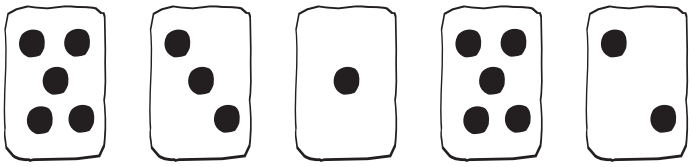


How much is 10% of 45? _____

What are the next two numbers in this sequence?

$5\frac{2}{3}$, $6\frac{1}{3}$, 7 , _____ , _____

Jo is holding this card. 

Rose is holding these cards. 

Without looking, Jo picks one of Rose's cards.
What is the probability that Jo picks a card that matches hers?

Probability = _____

Calculate the following:

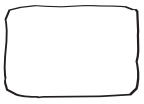
$-4+6=$ _____ $-8+2=$ _____ $-1+9=$ _____

$15-9=$ _____ $7-10=$ _____ $-8-8=$ _____

$10+1\times5=$ _____ $100-10\times7=$ _____

Add up all the correct answers and put your score in the box


31 and above: A+ student

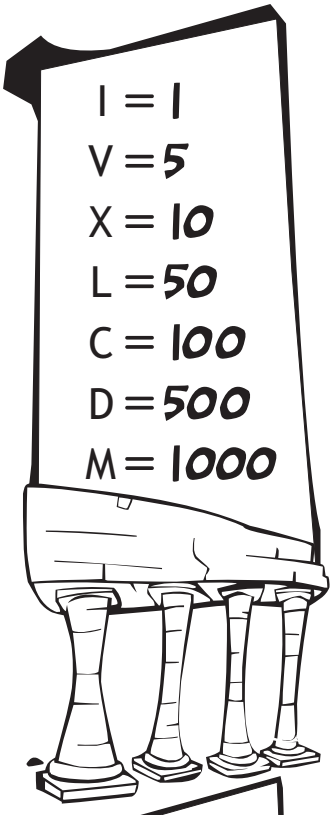


Always strive to be an A+ student.
Find out where you went wrong. If needed rub out your answers and try the test again another day.

$\frac{\quad}{36}$

ROMAN NUMERALS

Roman numerals are written as combinations of the seven letters in the table below. The letters can be written as capitals (XIV) or using lower-case (xiv). There are never any more than 3 consecutive letters e.g III = 3, IV = 4, XXX = 30, XL = 40.



If smaller numbers follow larger numbers, the numbers are added.

VIII $5+3=8$

LX $50+10=60$

CVI $100+5+1=106$

If a smaller number comes before a larger number, the smaller number is subtracted.

IX $10-1=9$

XIV $10+5-1=14$

XC $100-10=90$

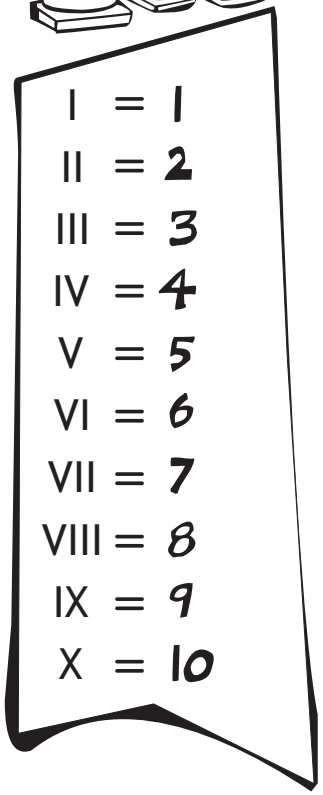
Subtract only powers of ten, such as I, X, or C.
XLV = 45 not VL

Subtract only a single letter from a single numeral.
VIII = 8 not IIX
XIX = 19 not IXX.

Do not subtract a letter from another letter more than ten times greater. This means that you can only subtract I from V or X, and X from L or C.
CXCIX = 199 not MIM

When writing a Roman Numeral convert one digit at a time.

974 = 900 + 70 + 4
= CM + LXX + IV
= CMLXXIV



Complete the table.

	= 14		= 61
XIX	=	LXX	=
XXVI	=		= 82
	= 39		= 90
	= 45	XCIX	=
LIV	=	MMVIII	=

Complete these sums. Write the answer in Roman Numerals.
The first one is done for you.

XV + XXV = 15 + 25
= 40
= XL

IV - I

I + XL

XXIX - XXIV

LVII + XLIV

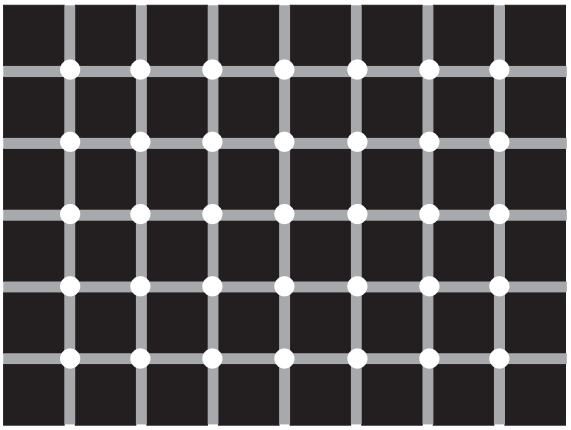
XXXIV - XX

LXXVII + XV

XCIV - LXXV

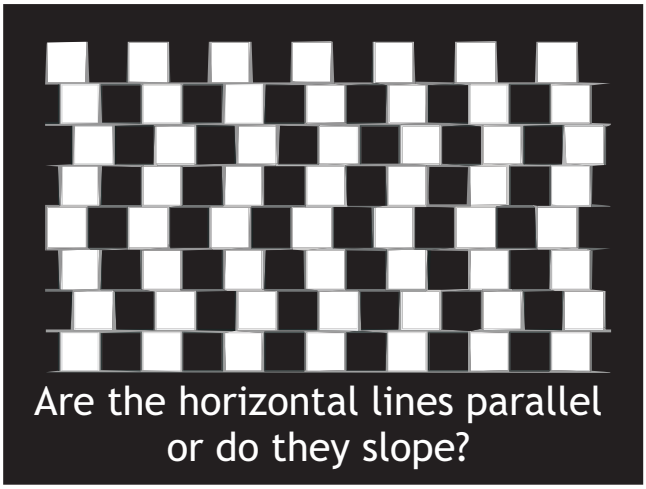
OPTICAL ILLUSIONS

Is it a face or is it a secret word?

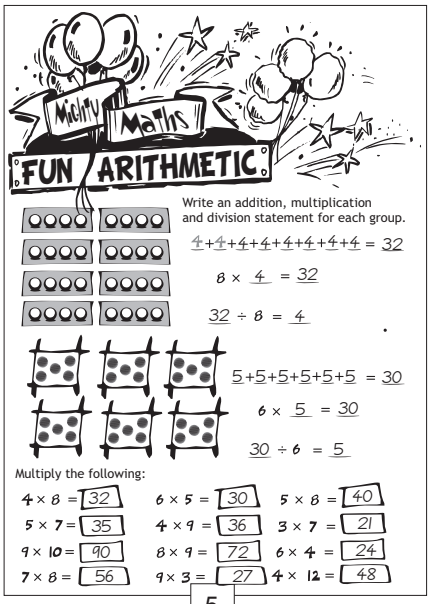


Stare and count the black balls.

Is she old or young?



Are the horizontal lines parallel or do they slope?



Write an addition, multiplication and division statement for each group.

4+4+4+4+4+4+4+4 = 32

8 × 4 = 32

32 ÷ 8 = 4

5+5+5+5+5+5 = 30

6 × 5 = 30

30 ÷ 6 = 5

Multiply the following:

4 × 8 = 32	6 × 5 = 30	5 × 8 = 40
5 × 7 = 35	4 × 9 = 36	3 × 7 = 21
9 × 10 = 90	8 × 9 = 72	6 × 4 = 24
7 × 8 = 56	9 × 3 = 27	4 × 12 = 48

5

BRAIN EXTENSIONS

FUN ADDITION

Calculate
101 + 2002 + 30003 +400004 + 5000005
5432100 + 1 + 2 + 3 + 4
= 5432115

Answer the questions then crack the code on the next page. (The first two are done for you.)

7 +8 F 15	5 +19 W 24		
25 +10 H 35	12 +14 B 26	35 +22 K 57	47 +31 T 78
17 +19 Y 36	24 +18 G 42	45 +27 D 72	62 +29 N 91
54 +57 S 111	73 +28 M 101	65 +78 I 143	33 +97 R 130
146 +273 C 419	262 +119 O 381	455 +275 A 730	387 +428 E 815

6

DOCTOR DOCTOR .....
I SWALLOWED A $10 NOTE!

C	O	M	E	B	A	C	K	
419	381	101	815	26	730	419	57	
T	O	M	O	R	R	O	W	
78	381	101	381	130	130	381	24	
A	N	D		S	E	E		I	F
730	91	72		111	815	815		143	15
T	H	E	R	E		I	S		A	N	Y
78	35	815	130	815		143	111		730	91	36
C	H	A	N	G	E						
419	35	730	91	42	815						

$10

7

BRAIN EXTENSIONS

FUN SUBTRACTION

The pattern 123451234512345.... is continued until a 1000 digit number is formed. What is the sum of all the 1000 digits?
There are 200 blocks of 5432
The sum of each block is 15
200×15 = 3000

Answer the questions then crack the code on the next page. (The first one is done for you.)

9 −3 F 6	18 −15 U 3	27 −12 K 15	42 −20 E 22
56 −15 Y 41	20 −18 D 2	44 −27 P 17	32 −6 L 26	55 −39 M 16
392 −159 A 233	287 −148 S 139	127 −95 N 32	246 −183 R 63
654 −128 T 526	532 −215 I 317	434 −187 L 247	251 −177 O 74

8

DOCTOR DOCTOR .....
I CAN'T STOP MY HANDS FROM SHAKING!

D	O		Y	O	U		D	R	I	N	K			
2	74		41	74	3		2	63	317	32	15			
A		L	O	T	?									
233		247	74	526										
N	O	T		R	E	A	L	L	Y					
32	74	526		63	22	233	247	26	41					
I		S	P	I	L	L		M	O	S	T			
317		139	17	317	247	26		16	74	139	526			
O	F		I	T	!									
74	6		317	526										

9

BRAIN EXTENSIONS

Calculate half of 999. 499 1/2

Calculate 2002 × 5 10010

If 657 is multiplied by 1729 what is the units digit of the answer?
7 × 9 = 63 units digit is 3

Answer the questions then crack the code on the next page. (The first one is done for you.)

17 ×5 I 96	23 ×7 R 85	L 161	
35 ×6 P 180	49 ×8 F 392	34 ×9 C 306	26 ×8 W 208
123 ×4 O 492	46 ×3 T 138	121 ×5 A 605	137 ×8 J 1096
181 ×6 U 1086	144 ×3 N 432	259 ×2 E 518	168 ×4 S 672

10

DOCTOR DOCTOR .....
I SWALLOWED A PEN. WHAT SHOULD I DO?

J	U	S	T		U	S	E							
1096	1086	672	138		1086	672	518							
A		P	E	N	C	I	L							
605		210	518	432	306	96	161							
F	O	R		N	O	W	!							
392	492	85		432	492	208								

BRAIN EXTENSIONS

The value of 9/5 lies between 9 and 10.

What are the possible values of □?

45/5 =9 50/5 =10

Possible values are 46, 47, 48 and 49

11

BRAIN EXTENSIONS

Replace each blank with the correct digit.

1 9 2 6
3 4
+ 5 7 8
2 5 3 8

Answer the questions then crack the code on the next page. (The first one is done for you)

28 ÷ 2 = H 14	36 ÷ 9 = V 4		
35 ÷ 5 = S 7	42 ÷ 21 = C 2		
27 ÷ 7 = I 3	40 ÷ 4 = F 10		
30 ÷ 2 = T 15	12 ÷ 1 = R 12		
24 ÷ 3 = M 8	50 ÷ 2 = O 25		
90 ÷ 10 = E 9	80 ÷ 4 = A 20		

12

DOCTOR DOCTOR .....
I THINK I'M A STRAWBERRY!

I	H	A	V	E		S	O	M	E					
3	14	20	4	9		7	25	8	9					
C	R	E	A	M		F	O	R						
2	12	9	20	8		10	25	12						
T	H	A	T	!										
15	14	20	15											

BRAIN EXTENSIONS

Grandma puts a pie in the oven and has to take it out exactly 10 minutes later. However she only has 2 egg timers - a four minute timer and a 7 minute timer. How can she use the timers to measure exactly 10 minutes?

Start the timers together. When 4 minutes is up put the pie in the oven for the remaining 3 minutes. Turn the 7 minute timer over and use for the remaining 7 minutes

13

FUN ARITHMETIC

157 + 255 = M 412	314 + 286 = V 600	285 + 275 = P 560	93 + 148 = B 241
459 + 170 = T 629	268 + 266 = S 534	131 + 99 = E 230	343 + 219 = O 562
432 − 185 = K 247	375 − 148 = R 227	213 − 139 = C 74	304 − 106 = H 198
554 − 266 = O 288	410 − 153 = A 257	222 − 58 = S 164	371 − 172 = U 199
375 × 2 = N 750	113 × 8 = Y 904	236 × 3 = E 708	145 × 4 = T 580
264 × 5 = E 1320	157 × 7 = S 1099	383 × 6 = O 2298	169 × 9 = Y 1521

35 ÷ 5 = S 7 42 ÷ 2 = A 21

56 ÷ 7 = U 8 60 ÷ 5 = O 12

14

DOCTOR DOCTOR .....

I THINK I'M A BISCUIT!

YOU MEAN THOSE (1521 12 199 412 230 257 750 580 198 562 164 1320)

SAVORY ONES (1099 21 600 2298 227 1521 288 750 708 7)

THAT YOU PUT (629 198 257 580 904 12 199 560 8 580)

CHEESE ON? (74 198 708 1320 164 230 562 750)

YOU MUST BE (904 288 8 412 8 534 629 241 230)

CRACKERS! (74 227 21 74 247 708 227 164)

15

BEAT THE CALCULATOR

Time yourself on the first set without using a calculator. On the second set use a calculator. Which method is quickest? Which has the least mistakes?

8 + 6 = 14 2 + 19 = 21
14 + 5 = 19 27 + 12 = 39
17 − 6 = 11 23 − 15 = 8 12 − 8 = 4
25 − 7 = 18 10 − 2 = 8 27 − 17 = 10
12 × 6 = 72 8 × 9 = 72 4 × 11 = 44
5 × 7 = 35 10 × 5 = 50 0 × 3 = 0
20 ÷ 5 = 4 36 ÷ 4 = 9 6 ÷ 6 = 1

18 + 7 = 25 13 + 7 = 20 4 + 27 = 31
2 + 9 = 11 26 + 15 = 41 25 + 15 = 40
13 − 8 = 5 25 − 19 = 6 14 − 2 = 12
23 − 7 = 16 13 − 4 = 9 33 − 16 = 17
15 × 6 = 90 8 × 8 = 64 5 × 13 = 65
9 × 7 = 63 10 × 7 = 70
200 ÷ 5 = 40 125 ÷ 5 = 25

16

BRAIN EXTENSIONS

Kim Freeman asks you to open your maths book to the facing pages whose numbers sum to 85. Which pages should you turn to?

42 + 43 = 85

Jones saves $2 during January, $4 during February and $6 during March. If he continues with the same savings pattern how much will he have saved after 1 year?

2 + 4 + 6 + 8 + 10 + 12 + 14 + 16 + 18 + 20 + 22 + 24 = $156

All the numbers from 0 to 16 must be placed in the squares.

The sum of the 4 numbers in each row, column and diagonal is 30.

3	13	14	0
4	10	9	7
8	6	5	11
15	1	2	12

15+12 = 27 therefore the two missing numbers must be 1 and 2

The average of seven numbers is 100. If 1 is added to the first number, 2 is added to the second number, 3 is added to the third number and so on up to the seventh number, what is the new average?

$100 + \frac{(1+2+3+4+5+6+7)}{7} = 104$

17

ROUNDING

Give these amounts to the nearest hundred dollars.

221 = 200 (To the nearest 100)

179 = 200 (To the nearest 100)

$219 → $200	$654 → $700	$839 → $800
$1579 → $1600	$92 → $100	$45 → $0

Round these amounts to the nearest ten.

49 ≈ 50 268 ≈ 270 534 ≈ 530

1111 ≈ 1110 227 ≈ 230 455 ≈ 460

Rewrite these times to the nearest hour.

1 hr 15 min ≈ 1hr 29 min ≈ 0hr

33 min ≈ 1hr 100 min ≈ 2hrs

5 hr 50 min ≈ 6hrs 90 min ≈ 2hrs

18

EVENS ODDS & PATTERNS

Even numbers divide exactly by: 2

List the even numbers between 50 and 80.

52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78

List the odd numbers between 20 and 30.

21, 23, 25, 27, 29

Look at the pattern below. If the number is even then it is divided by 2. If the number is odd then 1 is added to it.

100 50 25 26 13 14 7 8 4 2 1

Use the rule to complete these patterns.

36 18 9 10 5 6 3 4 2 1

59 60 30 15 16 8 4 2 1

42 21 22 11 12 6 3 4 2 1

Draw the next picture in the match-stick pattern.
Write how many sticks are needed for each pattern.

4 7 10 13

3 5 7 9

19

ORDER OF OPERATIONS

Calculate the answers to these sums.
Then write the sums in a different way and calculate the answer.

5 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 19
∴ 5 + 7 × 2 = 19

6 + 4 + 4 + 4 = 18
∴ 6 + 3 × 4 = 18

∴ means therefore.

12 + 6 + 6 + 6 + 6 + 6 = 42
∴ 12 + 5 × 6 = 42

8 + 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 48
∴ 8 + 8 × 5 = 48

27 + 12 + 12 = 51
∴ 27 + 2 × 12 = 51

25 + 3 + 3 + 3 + 3 + 3 = 40
∴ 25 + 5 × 3 = 40

19 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 = 31
∴ 19 + 12 × 1 = 31

9 + 8 + 8 + 8 + 8 + 8 + 8 = 57
∴ 9 + 6 × 8 = 57

20

Calculate the answer to each sum.
Hint: Use the diagrams to help.

3 + 3 × 9 = 30

2 + 4 × 4 = 18

8 + 9 × 2 = 26

6 + 5 × 10 = 56

25 − 2 × 3 = 19

11 − 2 × 5 = 1

20 − 5 × 4 = 0

21

ORDER OF OPERATIONS

The rules of arithmetic state that you must do multiplication before addition. Complete the sums then work out the answer to the code on the next page.

4 + 15 — 4 + 3 × 5 = E 19

10 + 16 — 10 + 2 × 8 = H 26

6 + 49 — 6 + 7 × 7 = G 55

4 + 24 — 9 + 4 × 6 = O 33

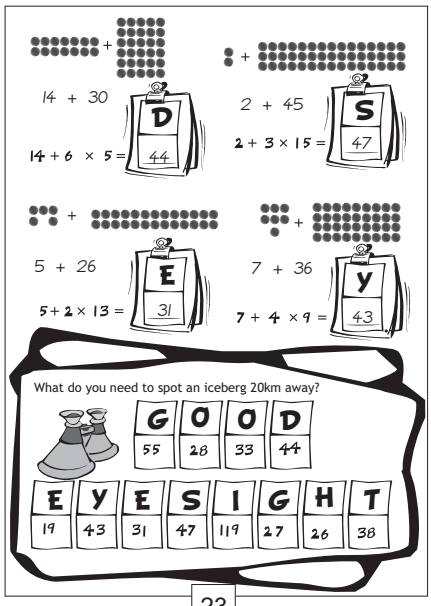
8 + 20 — 8 + 2 × 10 = O 28

3 + 35 — 3 + 5 × 7 = T 38

11 + 108 — 11 + 9 × 12 = I 119

15 + 12 — 15 + 1 × 12 = G 27

22



23

BODMAS

If a sum such as 4+5×2 has no brackets then it has been agreed by mathematicians that the multiplying is to be calculated before the addition. 4+5×2 = 14

If a sum has brackets such as 3×(8+2) then it has been agreed by mathematicians that the part inside the brackets will always be calculated first. 3×(8+2) = 30

There is an easy way to remember this - BODMAS.
1. Calculate Brackets first.
2. Calculate Division and Multiplication in the order they are written.
3. Calculate Addition and Subtraction in the order they are written.

Look at these examples:

$10 \times (2 + 7) = 90$ Calculate brackets (2+7)=9 then multiply by 10.

$12 \times 2 \div 8 = 3$ Calculate the multiplication and division in the order that they occur 12×2=24, 24÷8=3.

Now try these.

$7 + 3 \times 3 =$ 16
$= 7+9$

$6 + 3 \times 2 =$ 12
$= 6+6$

$9 + 4 \div 2 =$ 11
$= 9+2$

$12 + 6 - 3 =$ 15
$= 18-3$

$15 + 5 \times 4 =$ 35
$= 15+20$

$10 + 3 \times 2 =$ 16
$= 10+6$

$10 - 3 \times 3 =$ 1
$= 10-9$

$8 \times 4 + 5 =$ 37
$= 32+5$

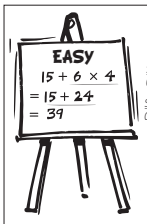
$5 + (6 \times 3) =$ 23
$= 5+18$

$24 \div 3 \times 2 =$ 16
$= 8 \times 2$

$10 \times 4 \div 2 =$ 20
$= 40 \div 2$

$8 + (4 \times 2) \times 2 =$ 24
$= 8 + 8 \times 2$

24



Look at these BODMAS examples then answer the exercises:

STEP 1
Calculate multiplication and division in the order they occur 6×4=24

STEP 2
Calculate addition and subtraction in the order they occur 15+24=39

$3 + 4 \times 7 =$ 31

$50 - 5 \times 5 =$ 25

$16 + 3 \times 2 =$ 22

$18 - 2 \div 2 =$ 17

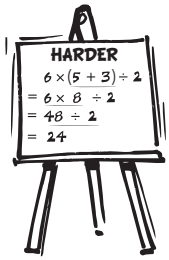
$19 - 2 \times 8 =$ 3

$40 + 7 \times 7 =$ 89

$23 + 5 \times 2 =$ 33

$22 + 15 \div 3 =$ 27

$12 - 8 \div 4 =$ 10



STEP 1
First calculate the sum inside the brackets (5+3) = 8

STEP 2
Calculate multiplication and division in the order they occur 6×8=48

$(3 + 3) \times (2 \times 2) =$ 24

$3 \times (8 + 2) \div 5 =$ 6

$40 \div (6 + 2) \times 3 =$ 15

$(9 + 4 \times 3) \div 7 =$ 3

$70 - (3 \times 4) \times 5 =$ 10

25

BODMAS

$100 - 20 \times 4$
$100 - 80 = 20$

$(45 - 15) + (37 - 7)$
$30 + 30 = 60$

$15 + 6 \times 6$
$15 + 36 = 51$

$(3 + 5) \times (3 + 6)$
$8 \times 9 = 72$

$(5 + 5) \times (5 - 3)$
$10 \times 2 = 20$

$50 - 7 \times 6$
$50 - 42 = 8$

$(4 + 8) \times (8 - 2)$
$12 \times 6 = 72$

$(10 - 3) + (6 \times 6)$
$7 + 36 = 43$

$(6 \times 7) + (2 \times 5)$
$42 + 10 = 52$

$58 - (4 \times 7)$
$58 - 28 = 30$

$88 - (10 \times 1)$
$88 - 10 = 78$

$(7 \times 7) + (4 \times 8)$
$49 + 32 = 81$

$(45 - 23) + (5 \times 8)$
$22 + 40 = 62$

$38 - 5 \times 7$
$38 - 35 = 3$

$100 - 45 + 7 \times 7$
$100 - 45 + 49 = 104$

$45 - 9 \times 4$
$45 - 36 = 9$

Each of these sums has the brackets in a different place. Calculate each of the answers.

$(4 + 4) \times 5 - 2 =$ 38
$4 + (4 \times 5) - 2 =$ 22
$4 + 4 \times (5 - 2) =$ 16
$4 + 4 \times 5 - 2 =$ 22

$(2 + 3) \times 4 - 1 =$ 19
$2 + (3 \times 4) - 1 =$ 13
$2 + 3 \times (4 - 1) =$ 11
$2 + 3 \times 4 - 1 =$ 13

26

Make the sums correct by putting in brackets to show which part has been completed first (one sum has no brackets).

$9 + (4 \times 5) - 3 = 26$

$9 + 4 \times (5 - 3) = 17$

$(9 + 4) \times 5 - 3 = 62$

$9 + 4 \times 5 - 3 = 26$

If there was no BODMAS rule then everybody who did arithmetic would get different answers. Use the rule to calculate the following:

$3 + 4 \times 3$
$= 3 + 12$
$= 15$

$7 - 6 + 11$
$= 1 + 11$
$= 12$

$2 \times 2 \times 4$
$= 16$

$(2 + 2) \times 5$
$= 4 \times 5$
$= 20$

$8 + 3 \times 3$
$= 8 + 9$
$= 17$

$5 \times 6 - 5$
$= 30 - 5$
$= 25$

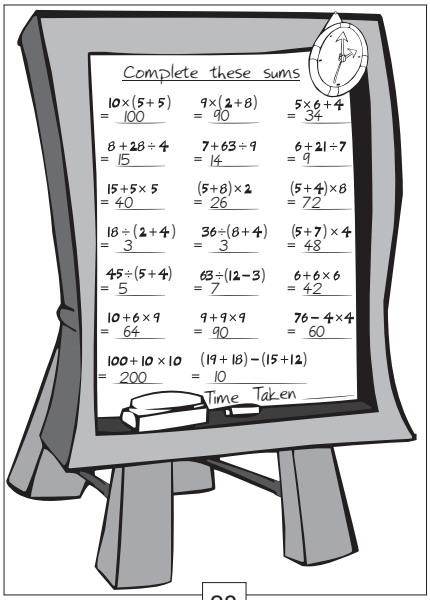
$10 \div 5 + 5$
$= 2 + 5$
$= 7$

$2 + 3 \times 6$
$= 2 \times 18$
$= 20$

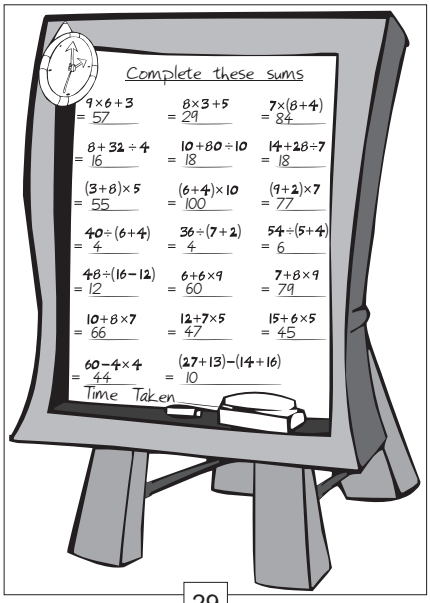
$(10 + 2) \div 4$
$= 12 \div 4$
$= 3$

$5 + 4 \times 4$
$= 5 + 16$
$= 21$

27



28



29

BODMAS

Use the BODMAS rules of arithmetic to complete the sums. Use the answers to work out the code on the next page.

T: $35 - 25 \div 5 =$ 30
35−5 = 30

O: $(6+2) \times 9 =$ 72
8×9 = 72

A: $38 + 12 \div 4 =$ 41
38+3 = 41

G: $12 + 4 \times 4 =$ 28
12+16 = 28

W: $8 \times 6 \div 8 =$ 6
48÷8 = 6

y: $20 + 9 \times 4 =$ 56
20+36 = 56

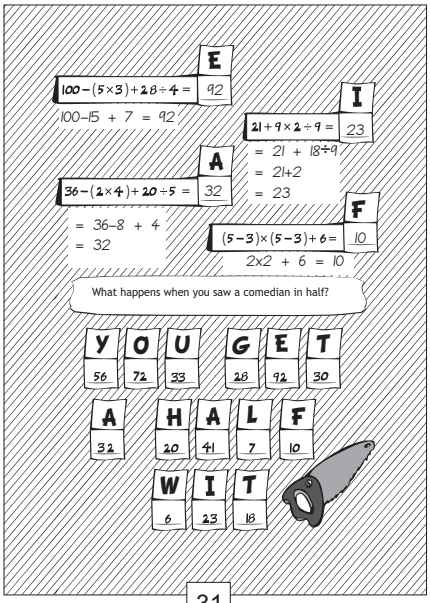
H: $100 - 20 \times 4 =$ 20
100−80 = 20

U: $17 + (8 \times 2) =$ 33
17+16 = 33

T: $27 - (6 \div 2) \times 3 =$ 18
= 27 − 3x3
= 27−9
= 18

L: $35 - (16 + 12) =$ 7
35−28 = 7

30



31

< means less than

> means greater than

The arrow always points to the smaller number.

Put in a greater or less than sign to make these statements correct.

$6+5\times3$	21	>	18	$3\times4+6$
$9\times9-20$	61	<	69	$7\times7+20$
$2\times20+46$	86	<	96	$56+4\times10$
$10+10\times5$	60	>	35	$10+5\times5$
$100-6\times7$	58	<	82	$6\times7+40$
$150+5\times8$	190	<	205	$40\times5+5$

Rewrite these sums and calculate the answer.

$4+4+4+4+4+3+3+3+3 = 5\times4+4\times3$
$= 32$

$8+8+8+2+2+2+2+2 = 3\times8+5\times2$
$= 34$

$7+7+7+5+5+5+5+5+5 = 4\times7+7\times5$
$= 63$

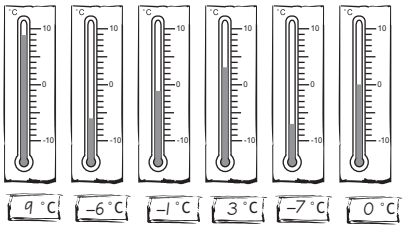
$6+6+9+9+9 = 2\times6+3\times9$
$= 39$

$1+1+1+1+1+1+1+1+1+1+7+7 = 10\times1+2\times7$
$= 24$

32

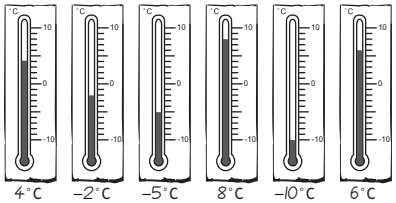
TEMPERATURES

Write the temperature shown on each thermometer.



9 °C | −6 °C | −1 °C | 3 °C | −7 °C | 0 °C

Colour the temperatures onto the thermometers.



4°C | −2°C | −5°C | 8°C | −10°C | 6°C

33

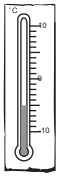
TEMPERATURES ARE HOT

Circle the temperature which is warmer.
Indicate how many degrees warmer it is.

8°C 3°C 5°C | −3C 5°C 8°C | 4°C −10C 14°C

−3C 2°C 5°C | −4C −8C 4°C | −6C 2C 8°C

Use the thermometer to help work out the temperature changes.



The temperature starts at -5°C.

	New Temperature
It then rises by 2°C	−3°C
It then rises by 13°C	10°C
It then falls by 4°C	6°C
It then falls by 10°C	−4°C
It then falls by 6°C	−10°C

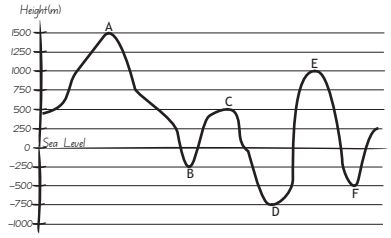
What could the temperatures be?
The temperature is more than -2°C but less than 5°C.
{ −1°, 0°, 1°, 2°, 3°, 4° }

The temperature is less than 6°C but more than -3°C.
{ 5°, 4°, 3°, 2°, 1°, 0°, −1°, −2° }

Note: only whole number temperatures are given

34

The diagram below is a geological cross-section. Write the heights of the mountains and the depths of the bottom of the sea.



A: 1500 | B: −250 | C: 500 | D: −750 | E: 1000 | F: −500

Write the heights in increasing order.
−750 −500 −250 500 1000 1500

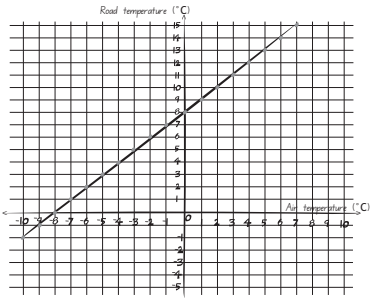
Fill in the middle box with a greater than (>) or less than (<) sign.
Write the difference between each number.

120 > 50	−10 < 90	−30 < 30
70	100	60
−70 < 20	−15 > −45	−50 < 0
90	30	50

35

The black surface of a road absorbs the sun's heat and becomes hotter than the air temperature. James has found that the road's surface is always 8°C hotter than the air temperature.
Complete the table to show what the two temperatures could be.
Plot the data by drawing dots on the graph.

Air temperature (°C)	0	−4	−8	2	−6	6	−9	−1	6	−3	−8	5	−7
Road temperature (°C)	8	4	0	10	2	14	−1	7	14	5	0	13	1

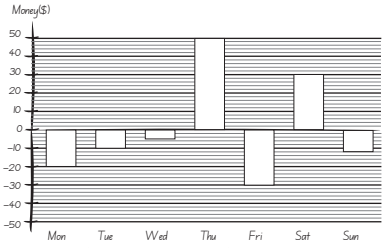


Each day a hotel receptionist has to write down the number of guests arriving and departing. Complete the bottom row of the table to show an increase or decrease of guests staying at the hotel each day.

Arrive	25	22	15	0	21	7	1	9	18	4	16	20
Depart	18	20	18	4	24	1	5	18	17	12	19	11
Change	+7	+2	−3	−4	−3	+6	−4	−9	+1	−8	−3	+9

36

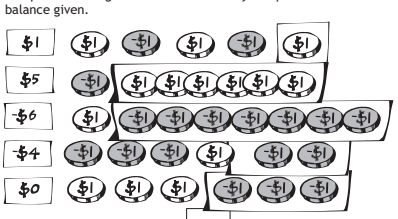
The graph shows Jake's income (+) and spending (-) last week.
In the boxes below write how much he earned or spent each day.



−$20 | −$10 | −$5 | $50 | −$30 | $30 | −$12

How much did Jake save last week? $3

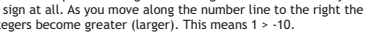
Complete the diagrams so that the money is equal to each balance given.



37

INTEGERS

Integers are similar to whole numbers. The main difference is that there are negative integers and positive integers.



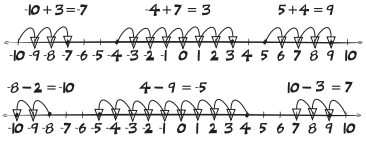
Integers become larger as you move to the right.

Negative integers are found on the left of zero and positive integers are found on the right of zero. Zero is neither positive or negative. Sometimes a positive integer has a + sign beside it but usually it has no sign at all. As you move along the number line to the right the integers become greater (larger). This means 1 > -10.

Write >, = or < between the two integers.

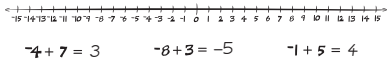
2 < 9	8 > 5	−4 < 7	3 > −3
0 < 6	−9 < −3	5 > −8	−5 = −5
4 > −6	−1 < 0	7 > −2	−2 < 0
−6 < 1	2 = 2	−2 > −6	−7 < −3

You add and subtract integers the same as any other number.



38

Use the number line to work out the answers to these sums.

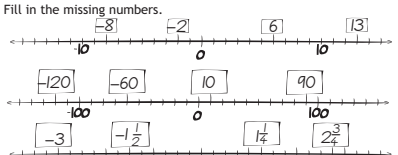


−4 + 7 = 3	−8 + 3 = −5	−1 + 5 = 4
−3 + 5 = 2	−2 + 2 = 0	−4 + 7 = 3
−8 + 6 = −2	−5 + 9 = 4	−3 + 11 = 8
−9 + 8 = −1	−8 + 14 = 6	−15 + 8 = −7
−12 + 15 = 3	−2 + 12 = 10	−1 + 15 = 14
−10 + 22 = 12	−7 + 12 = 5	−6 + 13 = 7
0 + 13 = 13	−15 + 4 = −11	−10 + 6 = −4
12 + 6 = 18	−10 + 1 = −9	−5 + 2 = −3
13 − 9 = 4	8 − 10 = −2	−6 − 6 = −12
−7 − 4 = −11	6 − 13 = −7	−12 − 15 = −27
−2 − 7 = −9	8 − 16 = −8	4 − 14 = −10
7 − 12 = −5	−7 − 8 = −15	12 − 25 = −13
1 − 15 = −14	15 − 19 = −4	−1 − 0 = −1
10 − 8 = 2	2 − 9 = −7	8 − 14 = −6

39

INTEGERS

Fill in the missing numbers.



Fill in the middle box with a greater than (>) or less than (<) sign.
Write the difference between each number.

12 > 5	0 < 9	−3 < 4
7	9	7
2 > −7	8 > −1	−5 < −4
9	9	1
−8 < 6	−2 > −3	−10 < 10
14	1	20

Continue the sequences for 3 terms (in both directions).

−15, −12, −9, −6, −3, 0, 3, 6, 9, 12, 15

−26, −20, −14, −8, 2, 4, 10, 16, 22, 28

40

INTEGER OPPOSITES

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

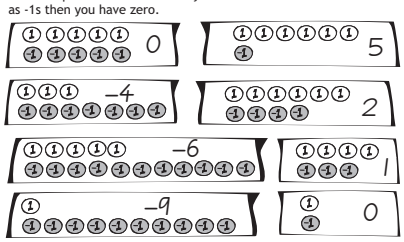
When you add integer opposites the result is always zero.
Add these integer opposites.

-2 + 2 = 0	-4 + 4 = 0	-7 + 7 = 0
2 + (-2) = 0	4 + (-4) = 0	7 + (-7) = 0
-9 + 9 = 0	9 + (-9) = 0	-5 + 5 = 0

Use the adding integer rule to add these add these integers.

-3 + 5 + 3 = 5	-6 + 8 + 6 = 8
-1 + 4 + 1 = 4	-9 + 7 + 9 = 7

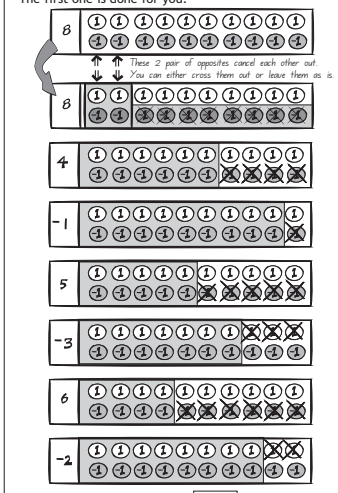
What do these diagrams represent? Remember, integer opposites sum to equal zero. Therefore if you have the same number of 1s as -1s then you have zero.



41

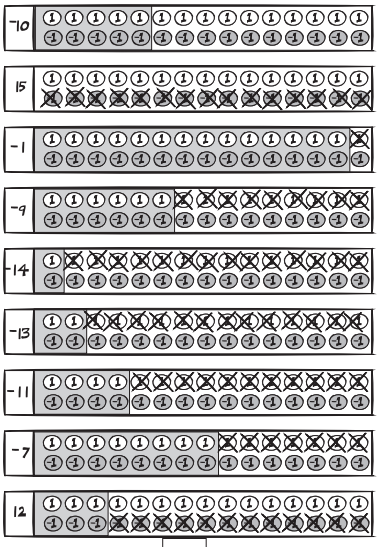
INTEGER OPPOSITES

When you add integer opposites the result is always 0 (zero).
Cross out the 1s (1) or the -1s (-1) to illustrate the number shown.
The first one is done for you.



42

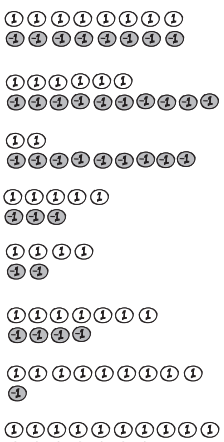
Cross out the 1s (1) or the -1s (-1) to illustrate the number shown.



43

INTEGER ARITHMETIC

Use the diagrams to help add these integers - remember, integer opposites sum to equal zero. If you have the same number of 1s as -1s then you have zero.



8 + (-8) = 0

6 + (-10) = -4

2 + (-9) = -7

5 + (-3) = 2

4 + (-2) = 2

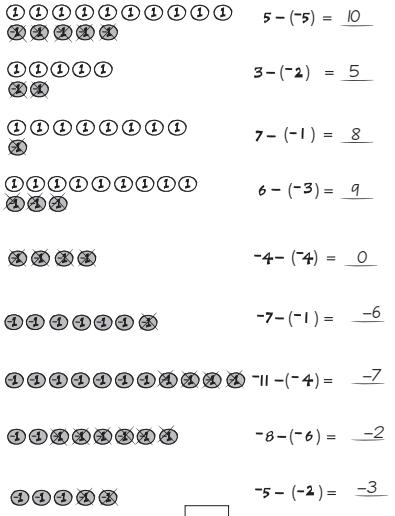
7 + (-4) = 3

9 + (-1) = 8

10 + (-7) = 3

44

Use the diagrams to help subtract these NEGATIVE integers.
Remember, integer opposites sum to equal zero. If you have the same number of 1s as -1s then you have zero.



5 - (-5) = 10

3 - (-2) = 5

7 - (-1) = 8

6 - (-3) = 9

-4 - (-4) = 0

-7 - (-1) = -6

-11 - (-4) = -7

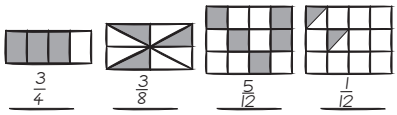
-8 - (-6) = -2

-5 - (-2) = -3

45

FRACTIONS

What fraction is shaded?



3/4 3/8 5/12 1/12

Put in a > or < symbol. (Try to make equivalent fractions)

(2/8) 1/4 < 1/8 (6/21) 2/7 > 5/21 10/12 < 7/6 (14/12)

Calculate:

One half of 18 18÷2=9	One quarter of 20. 20÷4=5	One third of 90. 90÷3=30
Two thirds of 90. Using one third=30 60	One fifth of 100. 100÷5=20 20	Three fifths of 100. Using one fifth=20 60

Put these fractions in order smallest to largest.

4/5 2/5 5/5 1/5 → 1/5 2/5 4/5 5/5

3/4 1/2 1/4 1/3 4/5 2/3 → 1/4 1/3 1/2 2/3 3/4 4/5

46

DECIMALS

Write the correct statement beside the decimal.

"Just a bit bigger than 50", "Almost 51", "Midway between 50 & 51"

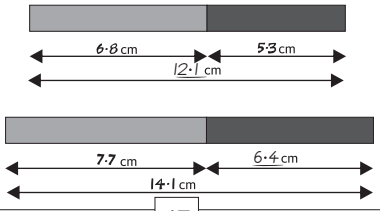
50·5 Midway between 50 and 51
50·2 Just a bit bigger than 50
50·7 Almost 51

Write the following as decimal numbers:

Two point eight 2·8
Twenty seven point nine 27·9
Thirteen point five 13·5
One tenth 0·1

1/2 0·5
3/4 0·75
2/5 0·4

Find the missing lengths.



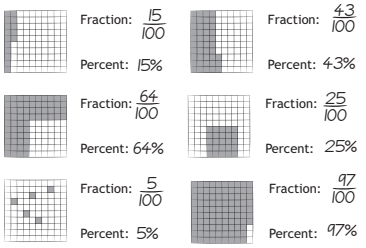
47

PERCENTAGES %

A fraction with a denominator of 100 is easier to write as a percent.

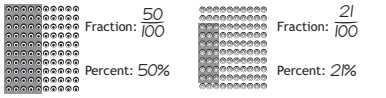
Ten percent	Twenty five percent	Eighty three percent
10/100 = 10%	25/100 = 25%	83/100 = 83%

What part of each square is shaded? Write your answer as a fraction over 100 and also as a number with a percent sign.



Fraction: 15/100 Percent: 15%
Fraction: 43/100 Percent: 43%
Fraction: 64/100 Percent: 64%
Fraction: 25/100 Percent: 25%
Fraction: 5/100 Percent: 5%
Fraction: 97/100 Percent: 97%

What part of each group is shaded? Write your answer as a fraction over 100 and also as a number with a percent sign.



Fraction: 50/100 Percent: 50%
Fraction: 21/100 Percent: 21%

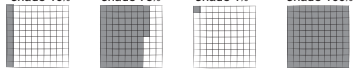
48

Complete each sentence. The first is done for you.

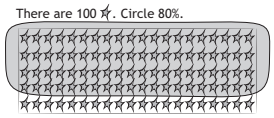
15% means . 15 . out . of . 100 . As a fraction it is written . 15/100 .
27% means . 27 . out . of . 100 As a fraction it is written . 27/100 .
50% means . 50 . out . of . 100 As a fraction it is written . 50/100 .
75% means . 75 . out . of . 100 . As a fraction it is written . 75/100 .

Each of the large squares below is divided into . 100 . small squares.

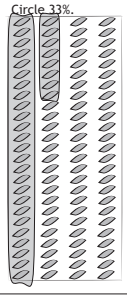
Shade 10% Shade 75% Shade 1% Shade 100%



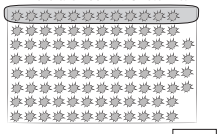
There are 100 ★. Circle 80%.



There are 100 . Circle 33%.



There are 100 ✵. Circle 12%



49

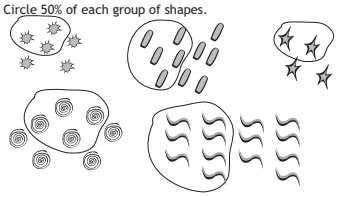
POPULAR PERCENTS %

Shade one half of the large square.

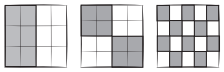
What percent is shaded? ...50.. %

One half of something means ...50.. % of it.

Circle 50% of each group of shapes.



For each of the three squares below answer the questions.



The square is divided into:	12	16	20
How many divisions are shaded?	6	8	10
What percentage is shaded?	50%	50%	50%

A Quick Rule:
To find 50% of a number divide by: 2

50

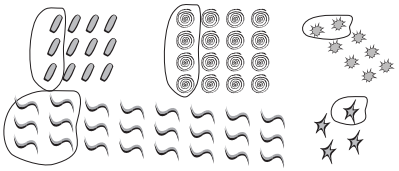
Shade one fourth of the large square.

What percent is shaded? ..25.. %

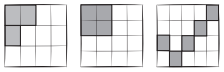
One fourth is also referred to as one quarter

One quarter of something means ...25.. % of it.

Circle 25% of each group of shapes.



For each of the three squares below answer the questions.



The square is divided into:	12	16	20
How many divisions are shaded?	3	4	5
What percentage is shaded?	25%	25%	25%

A Quick Rule:
To find 25% of a number divide by: 4

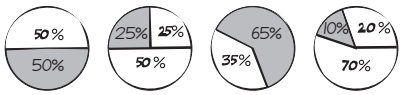
51

MORE PERCENTAGES %

All of something means ...100.. % of it.

A "pie chart" is a useful way to show statistical information. It is divided into pie slices. The complete circle is 100%.

Fill in the missing (shaded) percent for each pie chart below.



Complete the table below (the first column is done for you):

100%	28	80	200	32	12	60
50%	14	40	100	16	6	30
25%	7	20	50	8	3	15

Solve each problem below.

50% of 30 is 15 — 50% of 92 is 46

25% of 40 is 10 — 25% of 56 is 14

12 is 50% of 24 — 19 is 50% of 38

3 is 25% of 12 — 10 is 25% of 40

Shade 100% of these squares:

If you were asked to draw 200% of these squares how many would you draw? A total of 6 squares

52

SQUARES & SQUARE ROOTS

Squares - multiply the number by itself.
Square Roots - what multiplies by itself to give that number?

5^2 (5 squared) means $5 \times 5 = 25$ — $\sqrt{36} = 6$ because $6 \times 6 = 36$

10^2 means $10 \times 10 = 100$ — $\sqrt{64} = 8$ because $8 \times 8 = 64$

Calculate these squares and square roots.

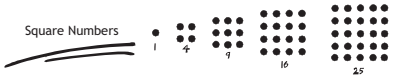
$2^2 = 4$ — $7^2 = 49$ — $9^2 = 81$

$7^2 = 49$ — $11^2 = 121$ — $13^2 = 169$

$\sqrt{49} = 7$ — $\sqrt{144} = 12$ — $\sqrt{16} = 4$

$\sqrt{25} = 5$ — $\sqrt{100} = 10$ — $\sqrt{81} = 9$

Square Numbers



The first 5 square numbers are: 1 4 9 16 25
Each is found by squaring the numbers: 1 2 3 4 5

Write the first 15 square numbers.

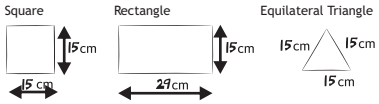
1 4 9 16 25 36 49 64 81 100 121 144 169 196 225

53

PERIMETER

Calculate the perimeters of these shapes.
(The shapes are not drawn to scale.)

Square — Rectangle — Equilateral Triangle

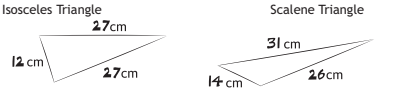


= 15x4 = 60cm

= (2x29)+(2x15) = 58 + 30 = 88cm

= 15x3 = 45cm

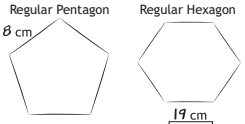
Isosceles Triangle — Scalene Triangle



= 12 + (2x27) = 66cm

= 14 + 31 + 26 = 71cm

Regular Pentagon — Regular Hexagon



Pentagon

5x8cm = 40cm

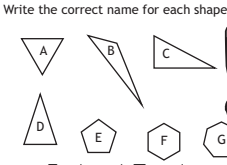
Hexagon

6x19cm = 114cm

54

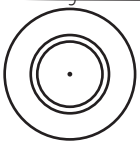
SHAPES

Write the correct name for each shape from the list.



Equilateral Triangle
Hexagon
Octagon
Scalene Triangle
Heptagon
Right Angled Triangle
Pentagon
Isosceles Triangle

A Equilateral Triangle
B Scalene Triangle
C Right Angled Triangle
D Isosceles Triangle
E Pentagon
F Hexagon
G Hepagon
H Octagon



Write these measurements:

Smallest circle
Diameter= 25mm Radius= 12•5mm

Middle circle
Diameter= 30mm Circumference=94mm

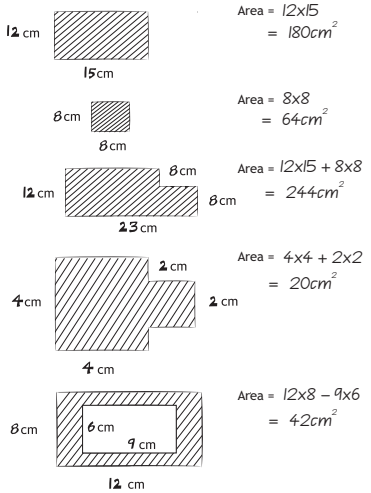
Largest circle
Radius = 25mm Circumference=157mm

Hint: You many need a piece of string to measure the circumference.

55

AREA

Calculate the shaded areas of each shape.
The shapes are not drawn to scale.



Area = 12x15 = 180cm²

Area = 8x8 = 64cm²

Area = 12x15 + 8x8 = 244cm²

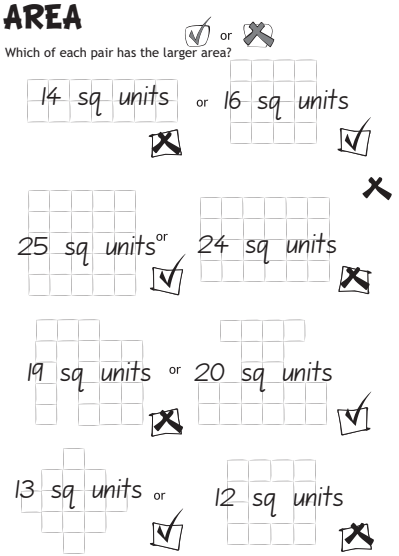
Area = 4x4 + 2x2 = 20cm²

Area = 12x8 − 9x6 = 42cm²

56

AREA

Which of each pair has the larger area?



57

VOLUME

The ...volume... of a solid is the amount of space inside it. It is calculated by multiplying length, width and height. If all the measurements are in cm then the volume is measured in cubic centimetres (abbreviated to cm^3).

If the shapes below are made of 1 cm cubes, determine the volumes.

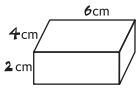
Length = 4 cm
Width = 2 cm
Height = 3 cm
Volume = 4 × 2 × 3 = 24 cm^3

Length = 4 cm
Width = 3 cm
Height = 4 cm
Volume = 4 × 3 × 4 = 48 cm^3

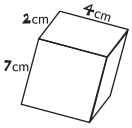
Length = 4 cm
Width = 4 cm
Height = 1 cm
Volume = 4 × 4 × 1 = 16 cm^3

58

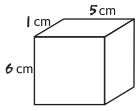
Calculate the volume of the following rectangular prisms.
The prisms are not drawn to scale.



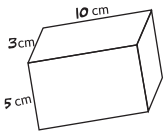
Volume = 6cm × 4cm × 2cm
= 48 cm³



Volume = 4cm × 2cm × 7cm
= 56 cm³



Volume = 5cm × 1cm × 6cm
= 30 cm³



Volume = 10cm × 3cm × 5cm
= 150 cm³

VOLUME

Complete the table below.

Length	Width	Height	Volume
5 cm	1 cm	7 cm	35 cm³
6 cm	5 cm	7 cm	210 cm³
7 cm	3 cm	3 cm	63 cm³
8 cm	2 cm	2 cm	32 cm³
9 cm	7 cm	4 cm	252 cm³
10 cm	5 cm	6 cm	300 cm³
12 cm	8 cm	5 cm	480 cm³

The volume of a solids are usually measured in cm³
Volumes of liquids are measured in mL (millilitres) or L (litres).
The following example shows how to convert mL to L and cm³ to m³

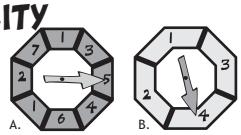
1 cm × 1 cm × 1 cm = cm³
= 1 mL (millilitre)

10cm × 10cm × 10cm = 1000 cm³
= 1 L (litre)

1m = 100cm
∴ 100cm×100cm×100cm = 1000 000 cm³
= 1 000 000 mL
= 1 000 L

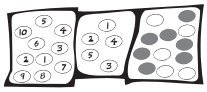
PROBABILITY

Greta has two spinners.



What is the probability of spinning a "5" on Spinner A?
Write your answer as a fraction. 1/8

Greta says "I am equally likely to spin a 1 on Spinner A as on Spinner B". Is Greta correct? Explain your answer.
Spinner A has probability 2/8
Spinner B has probability 1/4
They are equivalent fractions. Greta is correct.



What is the probability:

Of getting a 3 out of Tin A? 1/10

Of getting an odd number out of Tin B? 3/5

Of getting a grey ball out of Tin C? 7/12

If you wanted a Number 5 ball would you be more likely to get it from Tin A or Tin B? Explain why.
Probabilities are one tenth (Tin A) or one fifth (Tin B)
There is a better chance from Tin B.

PROBABILITY

Lauren, Kristen and Kyle each toss a coin several times and write their results in the table below. Complete the table.

Outcome	Lauren	Kristen	Kyle	Totals (frequency)	Ratio (relative frequency) Fraction	Decimal	Percentage
Head	49	33	24	106	106/200	0·53	53%
Tail	51	27	16	94	94/200	0·47	47%
Total Tosses				200			

Toss a coin 20 times and note each result in the table below.

Outcome	Prediction	Toss Results 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	Totals
Head		Everybody will get different results	
Tail			

Statistics results are better analysed if there are many trials.
Collect the data from 4 others who have done the same 20 coin toss experiment. Then fill in the table below. (You may have to do the experiment another 4 times).

Outcome	Toss Results 1 2 3 4 5	Totals (frequency)	Ratio (relative frequency) Fraction	Decimal	Percentage
Head	Everybody will get different results				
Tail					

If you toss a coin are you more likely to get a Head or a Tail? Explain your answer.
More trials should show that you have an equal chance (0·5) of getting either heads or tails.

Toss two coins 24 times and note how they each land on the table.

	Toss Results 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	Totals
TT		
TH		
HT	Everybody will get different results	
HH		

What fraction of the tosses resulted in:

2 heads | 2 tails | 1 head and 1 tail | at least 1 tail

If you conducted the experiment again, would you expect the same results? Explain your answer.
You should expect results close to that achieved the first time (but not exactly the same).

Throw a dice 30 times and keep a tally of how it lands. Then complete the rest of the table below.

Outcome	Tally of 30 throws	Totals (frequency)	Ratio (relative frequency) Fraction	Decimal	Percentage
	Everybody will get different results				

PROBABILITY

Toss 3 different coins and note how they land in the table below.
Repeat 24 times.

	Toss Results 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	Totals
TTT		
TTH		
THT	Everybody will get different results	
THH		
HTT		
HTH		
HHT		
HHH		

Statistics results are better analysed if there are many trials.
Collect the data from 4 others who have done the same 24 times 3 coin toss experiment. Then fill in the table below.

Outcome	Toss Results 1 2 3 4 5	Totals (frequency)	Ratio (relative frequency) Fraction	Decimal	Percentage
TTT					
TTH					
THT	Everybody will get different results				
THH					
HTT					
HTH					
HHT					
HHH					

There are 6 black sheep and 10 white sheep in a flock.

What is the ratio of black sheep to white sheep? 6:10

What fraction of the sheep are black? 6/16

In a bag there are 40 coloured balls. The balls are either black or white. The ratio of white to black balls is 1 : 3.

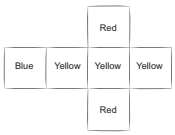
How many of each colour are their in the bag.

Black ball total = 30 White ball total = 10

Nigel takes a ball out of the bag. What is the probability that it will be black and what is the probability that it will be white?

Probability of black ball = 30/40 = 0·75 Probability of while ball = 10/40 = 0·25

Imagine this net folded to make a cube and then rolled like a dice.



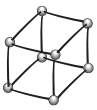
What is the probability that the red face will land facing upright?
Probability = 2/6

What is the probability that the yellow face will land facing upright?
Probability = 3/6

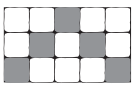
What is the probability that a colour other than blue will land facing upright?
Probability = 5/6

In a lottery 2 numbers are drawn from the balls above. List all the possible outcomes
1,2 1,3 1,4 1,5 2,1 2,3 2,4 2,5 3,1 3,2 3,4 3,5
4,1 4,2 4,3 4,5 5,1 5,2 5,3 5,4

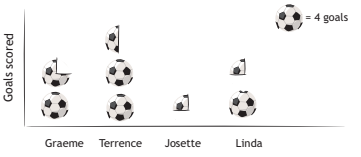
A MIGHTY MATHS TEST



This model can be made using plastic balls and straws. How may balls and straws would you need to make the model?
8 balls, 12 straws



What fraction of this figure is shaded?
5/15 1/3



The graph shows how many goals were scored by some players in the school football team in one season.
How many goals did each player score?

Graeme 7 Terrence 10

Josette 1 Linda 5

If you cut each of the three apples pictured into quarters how many quarters will you have in total? 12

This shape is made up of 3 squares each with sides 3cm long. What is the perimeter and the area of the shape?

Area = 27cm² Perimeter = 24cm

Helen is saving to purchase a washing machine.
A new machine costs $800
Helen has saved $280.
How much more money does Helen need to purchase the washing machine?

Amount needed: $ $520

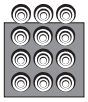
Josh gets on the bus at 3:48 pm and gets off at 4:15 pm. How long is he on the bus?

Time on bus = 27minutes

1657·4

What is the hundreds value in the number 1657.4?

Value = Six hundred (600)



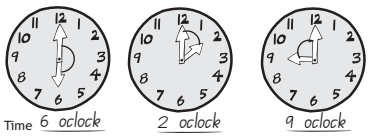
What is three quarters of twelve?

3/4 of 12 = 9

What is one quarter written as a decimal?

1/4 as a decimal = 0·25

Write down the time and angles formed on each clock.



Time 6 oclock | 2 oclock | 9 oclock

Angle 180° | 60° | 90°

A loaf of bread is $1.90,
A bread stick is $0.75

How much change would you get from $10 if you purchased 3 loaves of bread and 2 bread sticks

Change = $ 2·80

What operation is needed to make this sum true?

$5 + 16 \div 8 = 7$

This shape is made of a number of 1cm cubes.
How many 1 cm cubes are needed to make the shape?

Number of cubes = 18

The shape has now had a number of 1 cm cubes taken from it. How many cubes were taken?

4

How much is 10% of 45? 4·5

What are the next two numbers in this sequence?

$5\frac{2}{3}$, $6\frac{1}{3}$, 7, $7\frac{2}{3}$, $8\frac{1}{3}$

Jo is holding this card. 

Rose is holding these cards. 

Without looking, Jo picks one of Rose's cards.
What is the probability that Jo picks a card that matches hers?

Probability = $\frac{2}{5}$

Calculate the following:

$-4 + 6 =$ 2 $\quad -8 + 2 =$ −6 $\quad -1 + 9 =$ 8

$15 - 9 =$ 6 $\quad 7 - 10 =$ −3 $\quad -8 - 8 =$ −16

$10 + 1 \times 5 =$ 15 $\quad 100 - 10 \times 7 =$ 30

Add up all the correct answers and put your score in the box

31 and above: A+ student

Always strive to be an A+ student.
Find out where you went wrong. If needed rub out your answers and try the test again another day.

36

Complete the table.

XIV =	14	LXI =	61
XIX =	19	LXX =	70
XXVI =	26	LXXXII =	82
XXXIX =	39	XC =	90
XLV =	45	XCIX =	99
LIV =	54	MMVIII =	2008

Complete these sums. Write the answer in Roman Numerals.
The first one is done for you.

XV + XXV = 15 + 25
= 40
= XL

IV - I = 4 − 1
= 3
= III

I + XL = 1 + 40
= 41
= XLI

XXIX - XXIV = 29 − 24
= 5
= V

LVII + XLIV = 57+44
= 101
= CI

XXXIV - XX = 34 − 20
= 14
= XIV

LXXVII + XV = 77 + 15
= 92
= XCII

XCIV - LXXV = 94 − 75
= 19
= XIX

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ISBN 978-1877489-22-8
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