

Year 9 Course Outline

TERM 1

Week	Algebra	Geometry	Measurement	Number	Statistics
1	Introduction to Expressions	Introduction to angles	Introduction to Time	Excel work Computer lab Spreadsheet	Introduction to Statistics
2	Expressions (Substituting)	Naming angles measuring angles	Time - reading tables	Working with spreadsheets	Reading data tables Bar graphs
3	Expressions (Simplifying)	Drawing angles	Time 12 – hour 24 – hour	Working with spreadsheets Rounding	Dot plots
4	Expressions (Like terms)	Drawing and estimating angles	Time Daylight saving Time zones	Working with spreadsheets Add/subtract integers	Strip graphs
5	Expressions (Add like terms)	Angles on a straight line	Time Calendar	Working with spreadsheets Divide integers	Pictograms
6	Expressions (Subtract/Add like terms)	Angles complementary supplementary	Money Rounding	Working with spreadsheets Compound interest	Pie graphs
7	Introduction to formulae.	Angles – vertically opposite + proof	Money Reading tables	Working with spreadsheets Powers	Interpreting data
8	Formulae applications	Angles at a point	Temperature Reading	Working with spreadsheets Trend analysis	Intro to stem and leaf
9	Introduction to patterns and sequences	Angles – reflex	Types of scales Reading	Introduction to decimals	Stem and leaf
10	Working with expressions	Angles – missing	Length Measure and estimate	Decimals Comparing decimal values	Line graphs

Teachers can choose to work across each row with a different topic each lesson or choose to work down each column with 10 consecutive lessons on each topic.

Year 9 Course Outline TERM 2

Week	Algebra	Geometry	Measurement	Number	Statistics
11	Brackets these are worked first	Angles – rules for finding	Length Conversions mm – cm and mm – m	Decimals Adding Subtracting	Working with spreadsheets and graphs
12	More brackets	Introduction to reflection	Length Conversions cm – m and km – m	Decimals Multiplying Dividing	Data averages Mean
13	More operations	Reflection notation	Scale drawings Estimate distances	Decimals Money	Data averages Median
14	Introduction to powers	Reflection properties	Scale drawings Estimate lengths	Decimals Rounding Calculators	Data averages Mode
15	Index form	Introduction to rotation	Speed Distance/time	Decimals (Spreadsheet)	Reading a Spreadsheet
16	Index form substituting	Rotation – drawing accurately	Speed Average	Introduction to integers Comparing	Data Mean Median Mode
17	Index form multiplying	Rotation properties	Introduction to weight or mass	Integers Add/Subtract Multiply Divide	Data Frequency tables
18	Index form Dividing	Introduction to translation	Weight Metric conversions	Integers Applications	Data Histograms
19	Equations $N + 4 = 12$	Translation drawing accurately	Liquids Volumes Weights	Sequences	Data Sampling
20	Equations $N - 4 = 12$	Translation Introduction to vectors	Metric system Prefixes	Integers Practices Drills	Data Designing questionnaires

Year 9 Course Outline TERM 3

Week	Algebra	Geometry	Measurement	Number	Statistics
21	Equations $4xN = 12$ $N/4 = 12$	Translation properties	Area of different shapes	Multiples - follow on from sequences	Probability
22	Introduction to equation problems	Parallel lines and perpendiculars	Area of rectangles and squares	Multiples Common	Probability Tossing a die
23	More equation problems	Parallel lines Illusions	Area of triangles	Divisibility of factors	Probability Exercises
24	Equations with integers	Alternate angles	Area of parallelograms	Factors common	Probability Exercises
25	Equations with fractions Spreadsheet	Corresponding angles	Area of compound shapes	Prime numbers and prime factors	Probability Tree diagrams
26	Making up equations	Co-interior angles	Area of offset triangles and squares	Powers/Roots Index, Base	Probability Tree diagrams
27	Introduction use of rackets in Algebra	Angles Proofs	Area Hectares	Powers/Roots Negative numbers	Probability Tree diagrams
28	Expanding brackets – distributive rule	Bearings	Area Perimeter	Powers/Roots Applications Area/Volume	Probability Tree diagrams
29	Expanding brackets – integers	Bearings Applications	Area Circle	Square Roots	Probability General
30	Expanding brackets – collect like terms	Introduction to rotational symmetry	Area Circumference Diameter Perimeter	Introduction to BEDMAS	Probability General

Year 9 Course Outline TERM 4

Week	Algebra	Geometry	Measurement	Number	Statistics
31	Equations with brackets	Order of symmetry Axes of symmetry	Volume Blocks	BEDMAS Puzzles	
32	Equations with brackets	Symmetry in triangles: Equilateral Isosceles Scalene	Volume Cuboids	Introduction to fraction form	
33	Expressions Factorise numbers	Symmetry Quadrilaterals	Volume Prisms	Fractions Number line	
34	Expressions Factorise letters	Symmetry in quadrilaterals (Properties)	Volume Liquids	Fractions Equivalent	
35	Introduction to Co-ordinate Geometry Grids	3D Shapes Faces, edges and vertices		Fractions Simplifying	
36	Mathematical co-ordinates	Isometric drawings		Fractions Add/Subtract Multiply Divide	
37	Introduction to line graphs	Isometric drawings		Fractions Decimal conversions	
38	Line graphs Distance-time	Introduction to nets		Percentages Conversions	
39	Co-ordinate rules linking x and y co-ordinates	Nets Views		Percentages Increase Decrease	
40	Line graphs Interpreting	Nets Constructions			

YEAR 9 –TERM ONE EXAM

You will need a calculator, a pen, a ruler and a protractor to do this exam.

DO NOT WRITE YOUR ANSWERS ON THIS PAPER.

NUMBER

1. $68.9 + 5.46 + 21.13 =$
2. $0.25 \div 0.3625 =$
3. $(7445 - 253) \div 1798 =$
4. 17 litres of petrol cost \$37.23. How much does 1 litre of petrol cost?
5. Write this recurring decimal in long form: 32.8124
6. Write this recurring decimal in short form: 0.4626262626
7. $4 \div 7 =$ (4dp)
8. $51.162 \times 98.61 =$ (3dp)
9. How much for 1.32 kg of carrots at \$2.83 a kg? Round sensibly.
10. US\$0.7043 is worth NZ\$1. How many US\$ is NZ\$250?

Integers

Write the following sets of numbers (Questions 11 – 14) from smallest to largest:

11. $\{+ 4, - 4, + 1, - 2, + 6\}$
12. $\{92, - 63, - 65, - 24\}$
13. $\{- 593, + 344, -768, + 7, 0\}$
14. $\{- 84, - 63, + 13, +52, 0, + 11\}$
15. The temperature was 3°C and then it fell 6°C . What was the temperature then?
16. $-5 - +4 =$
17. $-94 - +81 =$
18. $-42 - 3 + -7 - -6 =$
19. $-5 \times -2 \times 3 =$
20. $2 \times -6 \times -7 \times -3 =$

ALGEBRA

Write an equivalent algebraic expression for each of these:

21. x take away 9
22. 7 more than x
23. 13 lots of x
24. 15 less than x
25. The number of days in x weeks

If $p = 4$, $q = 3$, $r = 2$, work out the following:

26. $5p$
27. pqr
28. $4pq$
29. $10pr$

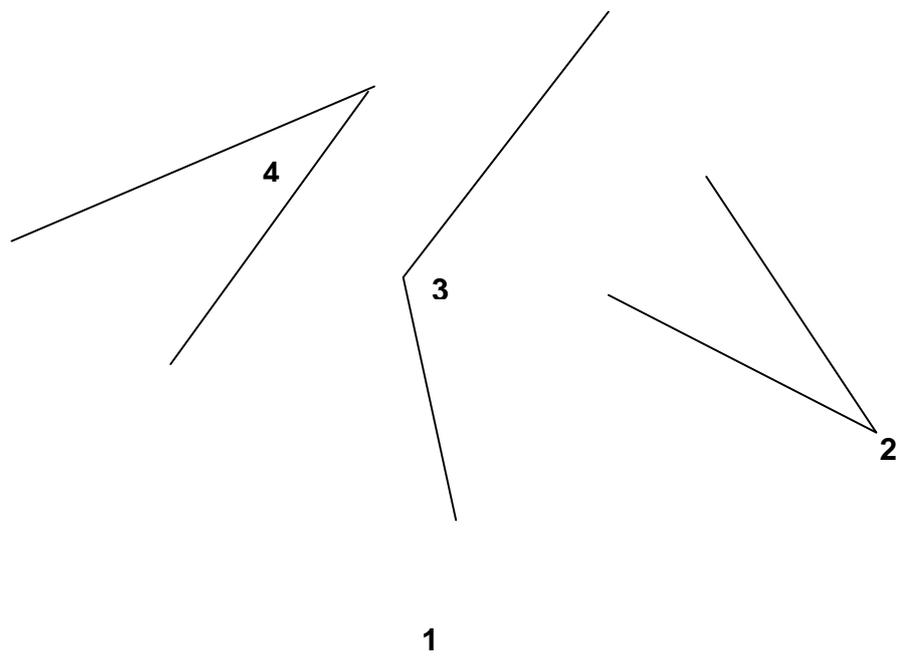
Simplify these expressions:

30. $8 \times 3f =$
31. $3a \times 5b =$
32. $4 \times 2p \times 3q \times r =$
33. $q \times r \times p =$

Simplify these expressions:

34. $2x + 3y + 6x =$
35. $2q - 2p + 4p =$
36. $3x + 7y - z + 2x =$
37. $c + 3d + 5e - 2c =$
38. $5x + 6y - 2x + 3y =$
39. $6x + 8 - x + 3 =$
40. $y + 2y + 8 - 7 + y =$

GEOMETRY

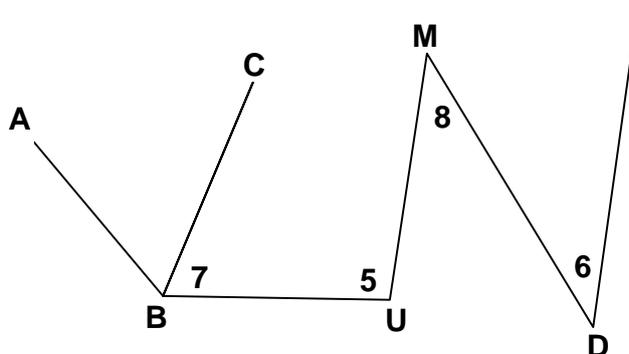


Write whether each of the above angles is **reflex**, **acute**, **straight** or **obtuse**:

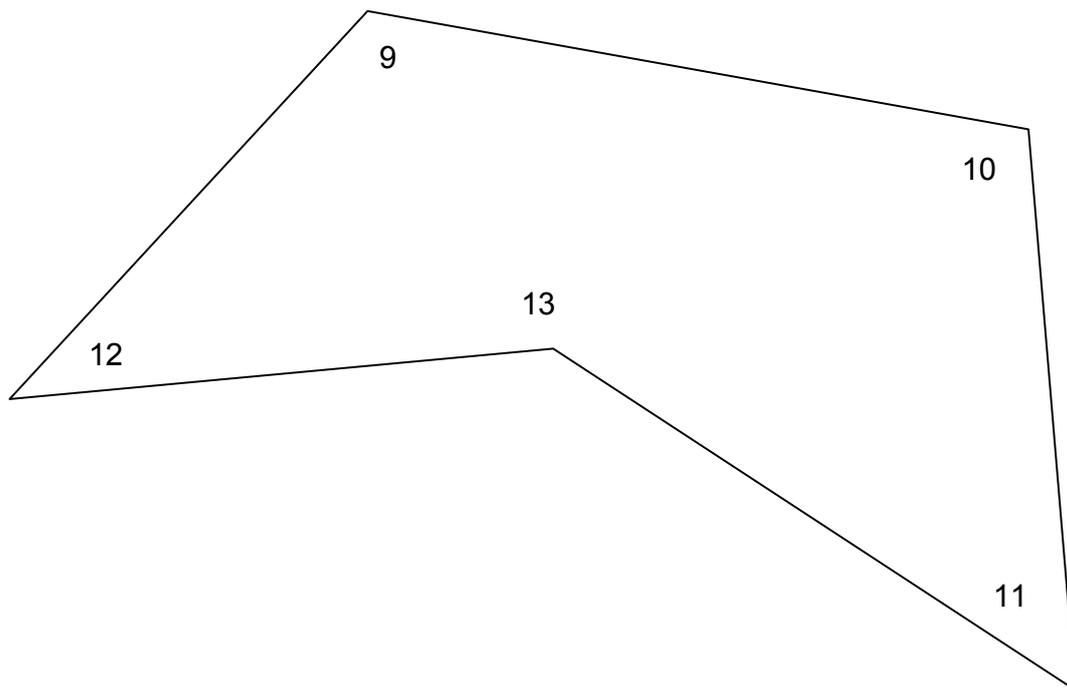
41. Angle 1 =
42. Angle 2 =
43. Angle 3 =
44. Angle 4 =

Name the angles marked 5, 6, 7 and 8

45. Angle 5 =
46. Angle 6 =
47. Angle 7 =
48. Angle 8 =

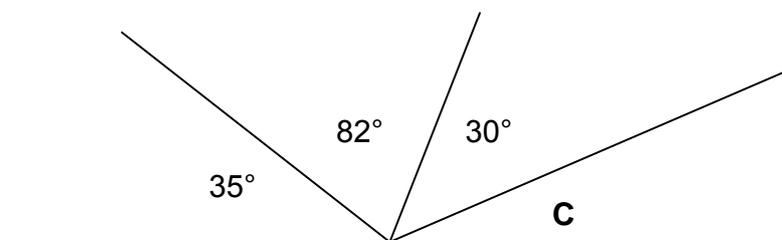
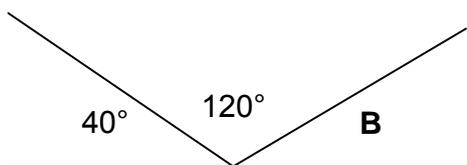
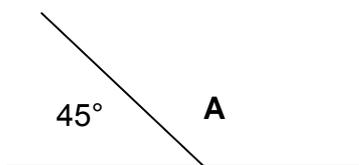


Measure these angles with a protractor.



- 49. Angle 9 =
- 50. Angle 10 =
- 51. Angle 11 =
- 52. Angle 12 =
- 53. Angle 13 =

Work out the size of each angle below. The diagrams are not to scale.



- 54. Angle A =
- 55. Angle B =
- 56. Angle C =

Say whether the following statements are True or False:

- 57. 112° and 68° are complementary.
- 58. 60° and 120° are supplementary.
- 59. 46° and 44° are complementary.
- 60. 35° and 65° are supplementary.

MEASUREMENT – Time and Money

Write these times using digits and am/pm:

- 61. Half past eight in the morning.
- 62. Twenty to four in the afternoon.
- 63. Ten minutes to midnight.
- 64. Five minutes to midday.
- 65. Quarter to nine in the evening.

Write these using the 24-hour clock:

- 66. Half past seven in the evening.
- 67. Twenty past nine in the morning.
- 68. Three thirty after school.
- 69. 11.10 pm
- 70. 8.40 am
- 71. How many minutes in 4 hours?
- 72. How many months in 4 years?
- 73. If it was Tuesday yesterday, what will it be the day after tomorrow?
- 74. The Treaty of Waitangi was signed in 1820, 1830, 1840, 1850 or 1860?

The months of winter are June, July, August. Write down the months of:

75. Summer =

76. Autumn =

77. Spring =

Here is a price list from a burger bar:

Item	Price	
Chicken sandwich	\$3.75	
Hamburger	\$3.50	
Cheeseburger	\$3.90	
Fries	Small \$1.30	Large \$2.10
Cola	Small \$1.10	Large \$1.80

How much will it be for:

78. 4 hamburgers and three small colas?

79. 2 cheeseburgers, 2 large fries, 2 small colas?

80. How much change would you get if you bought 4 cheeseburgers with a \$20 note?

STATISTICS

Here is a table of weather data for our town last year:

Month	Average max. temperature (°C)	Average min. temperature (°C)	Raindays	Rainfall (mm)
January	25.7	16.3	5	54
February	23.8	16.0	6	67
March	22.1	14.9	4	102
April	19.4	10.9	11	83
May	17.5	6.8	13	110
June	15.8	3.4	12	118
July	15.0	3.1	18	132
August	16.1	5.8	15	143
September	17.2	7.9	11	83
October	18.0	10.4	8	23
November	20.4	12.6	8	74
December	22.5	14.9	6	68

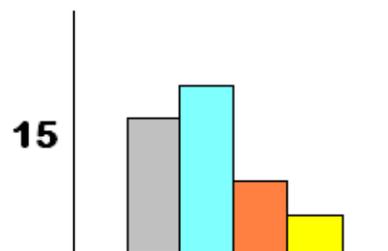
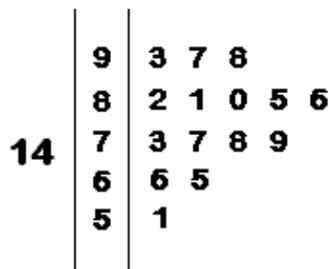
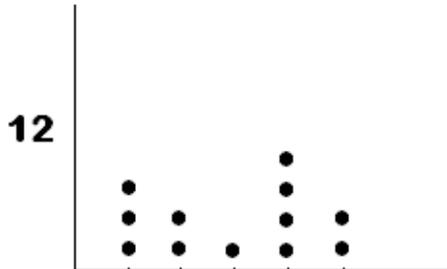
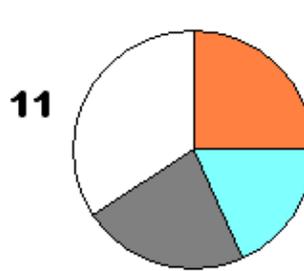
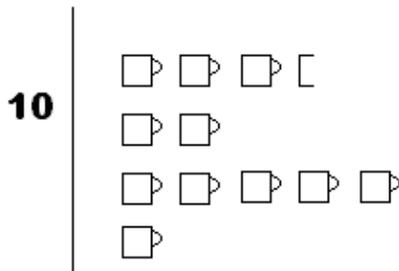
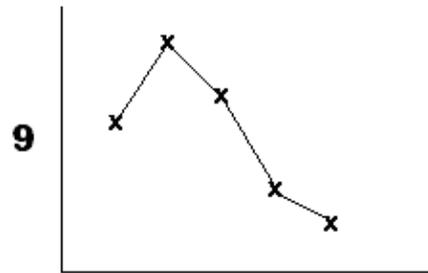
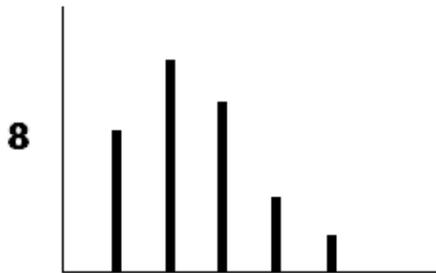
81. Which month was the coldest?

82. Which month had the most amount of rain?

83. Which was the driest month?
84. Which two months had the same rainfall?
85. How many months were hotter than 12°C?
86. Calculate the total amount of rainfall during the year.
87. Did the first or second half of the year have fewer rainy days?

Here are the names of 10 different types of graphs:

Strip graph Histogram Line graph Pictograph Pressure graph
Stem and Leaf Pie graph Dot plot Bar graph Temperature graph



Name the graphs above:

88. Graph 8 is called _____

89. Graph 9 is called _____

90. Graph 10 is called _____

91. Graph 11 is called _____

92. Graph 12 is called _____

93. Graph 13 is called _____

94. Graph 14 is called _____

95. Graph 15 is called _____

96. List the first 5 multiples of 19

97. Simplify: $5c + 4c + 17 - 15 + c =$

98. At five o'clock, how many degrees are there between the minute hand and the hour hand?

99. Use your calculator to add these times:

	Hour	:	Min	:	Sec
	5	:	54	:	35
+	2	:	27	:	34

100. A train is 3 kilometres long. It is travelling at 30 km/h – or $\frac{1}{2}$ kilometre per minute. How long would it take to completely cross a bridge that is 3 kilometres long?

NAME _____ MATHS TEACHER _____

NUMBER		ALGEBRA	
1		21	
2		22	
3		23	
4		24	
5		25	
6		26	
7		27	
8		28	
9		29	
10		30	
11		31	
12		32	
13		33	
14		34	
15		35	
16		36	
17		37	
18		38	
19		39	
20		40	

NAME _____ MATHS TEACHER _____

GEOMETRY		MEASUREMENT	
41		61	
42		62	
43		63	
44		64	
45		65	
46		66	
47		67	
48		68	
49		69	
50		70	
51		71	
52		72	
53		73	
54		74	
55		75	
56		76	
57		77	
58		78	
59		79	
60		80	

NAME _____ MATHS TEACHER _____

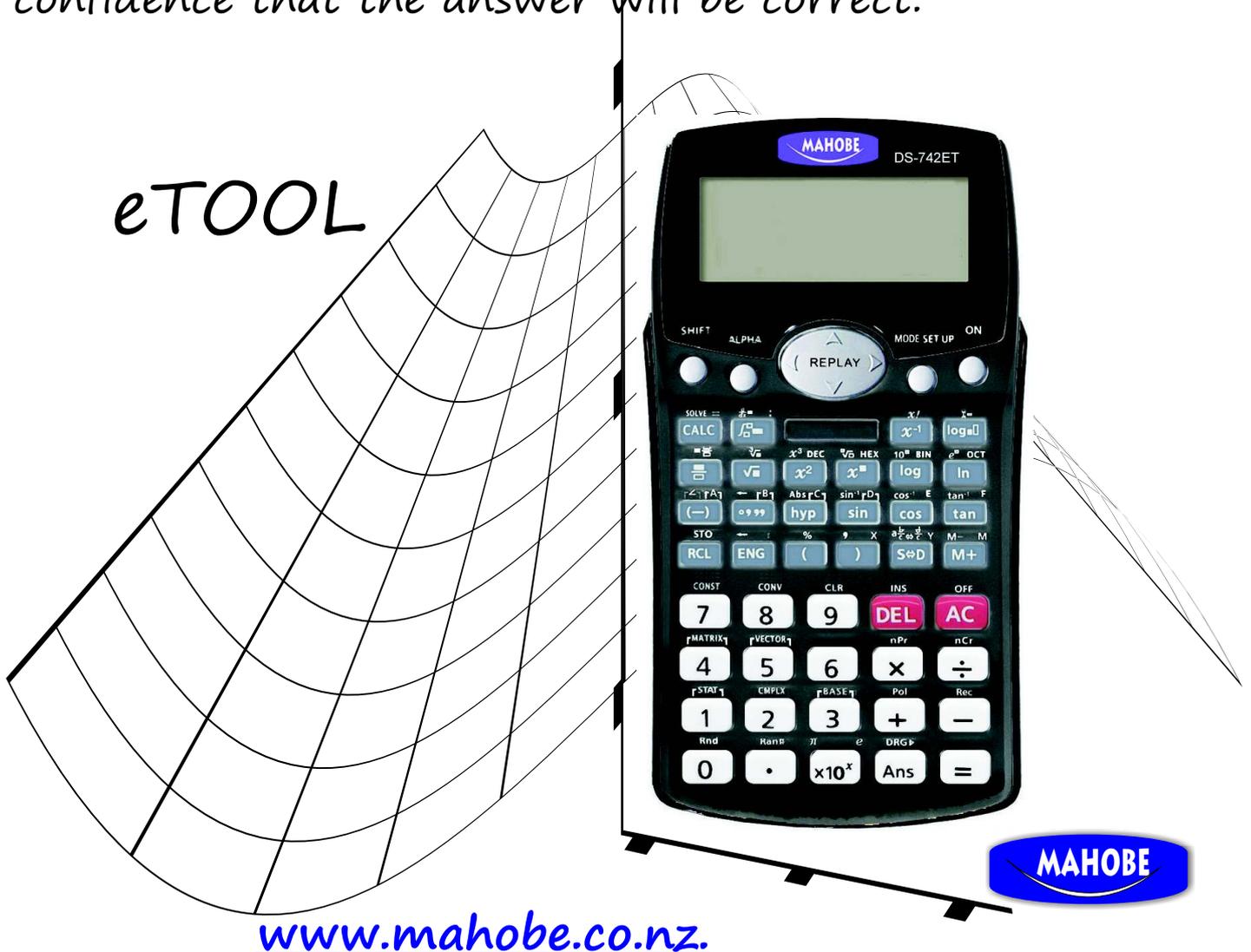
STATISTICS		
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100		

The DS-742ET

Mahobe have added some amazing technology into their new eTool advanced scientific calculator.

- Equation solving.
- Enhanced statistics.
- Improved powers and fraction display.

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YEAR 9 –TERM TWO PRACTICE EXAM

You will need a calculator, a pen and a ruler to do this exam.

DO NOT WRITE YOUR ANSWERS ON THIS PAPER.

NUMBER

1. Put in order from smallest to largest: 4.8062, 4.095, 4.86, 4.806, 4.095
2. $179.5 + 44.68 =$
3. $11.386 - 10.965 =$

Suzanne won a Mahobe College 100m swimming race in a time of 2 minutes. She broke the previous record by 3.5 seconds.

4. What was the previous record?
5. How fast was Suzanne swimming in km/h?
6. $0.5 \times 0.3 =$
 $8 \times 0.4 =$
 $0.007 \times 0.3 =$
 $5.0 \times 0.8 =$
7. $0.6 \times 10 =$
 $0.55 \times 100 =$
 $0.625 \times 1000 =$
 $0.008066 \times 1000 =$

Money

Foreign exchange rates (Buy note)

Australia 0.7623

United States 0.8601

Japan 84.5271

How much foreign currency will you receive when you change:

8. NZ\$700 to US dollars?
9. NZ\$900 to Australian dollars?
10. NZ\$15,000 to Japanese yen?

11. $90.6 \div 10 =$
 $0.78 \div 100 =$
 $0.00635 \div 0.25 =$
 $(78.15 + 0.0035) \div 0.05 =$
12. Debbie buys 8 bags of crisps for \$9.20. What does one bag cost?
13. If 5 rabbits eat 12.5 lettuces in 5 days, how many lettuces will 10 rabbits eat in 10 days?

Round your answer sensibly

14. A 48 cm strip of liquorice is cut into 7 equal pieces. How long is each piece?

Integers

The temperature at midnight is -6°C . What will the new temperature be if...

15. ...it falls by 5°C at 1am?
16. ...it rises by 9°C at 2am?

Put in order from smallest to largest:

17. -393 , $+427$, -822 , -4 , -6

Calculate

18. $+4 +^{-}5 +^{-}2 +^{+}10 =$
19. $^{-}6 \times^{+}2 =$
20. $2 \times^{-}4 \times^{-}5 \times^{-}5 =$

ALGEBRA

*If $x = 10$ and $y = 4$
Find the value of:*

21. $\frac{x}{2} + 4 =$
22. $xy + 3 =$

23. $\frac{x+2}{y} =$

24. $\frac{2x+8}{x+y} =$

Write these in full:

25. p^3q^2

26. cd^3

Write in index form:

27. $p \times 7p$

28. $3b \times 2b \times 10b$

If $x = 3$ and $y = 5$

Work out these:

29. $5x^2 =$

30. $(5x)^2 =$

31. $5y^2 - 3x^2 =$

Simplify these:

32. $k \times k^2 \times k =$

33. $p \times 5p^2 \times 4p^3 =$

34. $p^8 \div p^6 =$

35. $\frac{16m^5}{2m^3} =$

Solve these equations:

36. $x + 31 = 52$

37. $x - 102 = 43$

38. $9x = 5x + 24$

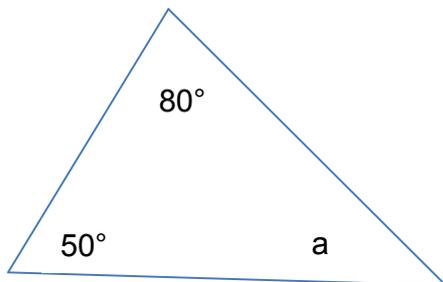
39. $16x = 6x + 80$

40. $11x - 14 = 19$

GEOMETRY

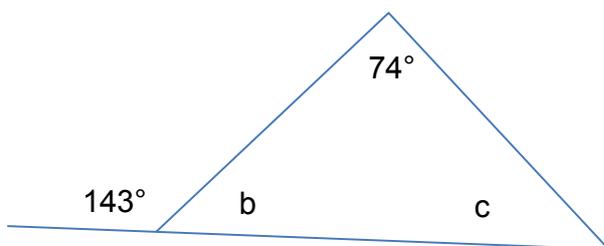
Work out the missing angles:

41. $a =$

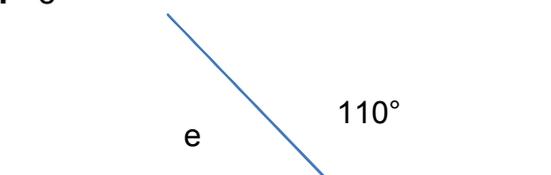


42. $b =$

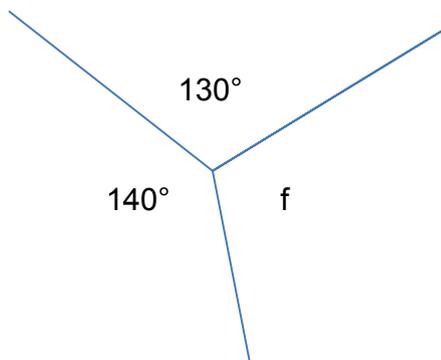
43. $c =$



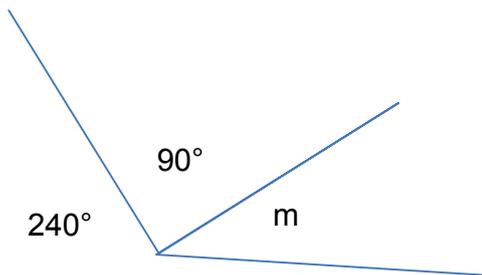
44. $e =$



45. $f =$



46. $m =$



True or False..?

- 47. Angles at a point add to 180°
- 48. Angles in a triangle add to 180°
- 49. Vertically opposite angles are equal
- 50. When a line is reflected it is smaller
- 51. The angle of rotation tells you the size of the image
- 52. In rotation there is only one invariant point
- 53. In reflection there is only one invariant point
- 54. In translation there are no invariant points
- 55. We use vectors to describe translations

PROBLEM SOLVING

- 56. Complete the next four in the sequence: AL, BM, CN, DO, __, __, __, __
- 57. Write two numbers whose sum is 43 and whose difference is 9.
- 58. In a rectangular field I put 12 fence posts on the long sides and there are 8 posts on the short sides. How many posts are used altogether?
- 59. How many times would I write a 5 if I number the pages in a book from 1 to 75?
- 60. I am thinking of a number. I multiply the number by 2 and then add 15. The answer is 49. What was my original number?

MEASUREMENT

Change these lengths to cm:

61. 90mm
45mm
130mm
84mm
62. 2.0m
1.5m
85m
0.7m
63. John swims 60 lengths of a swimming pool. The pool is 50m long. How many km does he swim?

The scale of this smartphone picture is 1:2.



64. How wide is the real smartphone in mm?
65. How long is this smartphone in mm?
66. A train takes 10 hours to travel 700km. What is its average speed?
67. A speedboat travels for 4 hours at an average speed of 75km/h. What distance does it travel?

What is the distance travelled in each of the following journeys?

68. 5 hours at an average speed of 40km/h?
69. 2 days at an average speed of 20km/h?
70. 15 minutes at an average speed of 200km/h?

Choose from milligrams, grams, kilograms, tonnes. Which **unit of mass** would be most suitable for each of the following:

- 71. A sack of carrots?
- 72. Your mobile phone?
- 73. A Boeing 747 aircraft?
- 74. A rubber band?

Change these to tonnes:

- 75. 4000kg
- 5420kg
- 750kg

Change these to kg:

- 76. 3000g
- 5400g
- 750g

At a wool auction, merino fleece sells for \$2400 per tonne. Calculate the cost of:

- 77. 1kg
- 500kg
- 73kg

Liquids

How many litres in:

- 78. 3000mL
- 3250mL
- 750mL

How many millilitres in:

- 79. 6L
 - 2.6L
 - 0.25L
80. Soft drink cans hold 333mL and plastic bottles hold 2L. How many cans hold the same amount as a 2L bottle?

STATISTICS

Construct a **stem and leaf** display for this set of data. These are golf scores for the Mahobe College Team.

84, 78, 75, 94, 101, 77, 88, 87, 91, 72, 100, 94, 82, 81, 73, 68, 76, 83, 77, 104, 83, 71, 82, 85, 74

(Your answer should include each of the following.)

81. Stem
 82. Leaf 1
 83. Leaf 2
 84. Leaf 3
 85. Leaf 4
 86. Leaf 5
-

Construct a **line graph**.

During Cultural Week students were counted through the Mahobe College gates. Some come early, some late. Here is the set of data.

Time counted in at gate	Number of students
6.30am	25
7.00am	50
7.30am	150
8.00am	350
8.30am	200
9.00am	50
9.30am	25

(Your answer should include each of the following.)

87. Title
88. Y-axis
89. X-axis
90. Y-axis label
91. X-axis label
92. Plotting data line

Construct a **frequency table**.

Over the last 45 days Sarah sent texts to her friends. She kept a daily record of the number she sent. This is her record:

9, 8, 8, 5, 6, 8, 7, 4, 5, 6, 8, 8, 4, 9, 5,
5, 6, 8, 3, 7, 7, 8, 5, 6, 4, 8, 7, 7, 7,
5, 8, 6, 7, 7, 6, 7, 5, 8, 4, 5, 6, 7, 8, 7

(Your answer should include each of the following.)

93. Title
 94. Number column
 95. Tally column
 96. Frequency column
-

Data set: 93, 89, 58, 54, 48, 43, 43, 39, 33

97. What is the median?
 98. What is the mode?
 99. What is the mean?
 100. What is the range?
-

Note to the student:

The end-of-term exam will be very similar to this paper.

If you study properly, it will be possible for you to get every question correct.

THIS IS YOUR GOAL!

Good luck!

NAME _____ MATHS TEACHER _____

NUMBER		ALGEBRA	
1		21	
2		22	
3		23	
4		24	
5		25	
6		26	
7		27	
8		28	
9		29	
10		30	
11		31	
12		32	
13		33	
14		34	
15		35	
16		36	
17		37	
18		38	
19		39	
20		40	

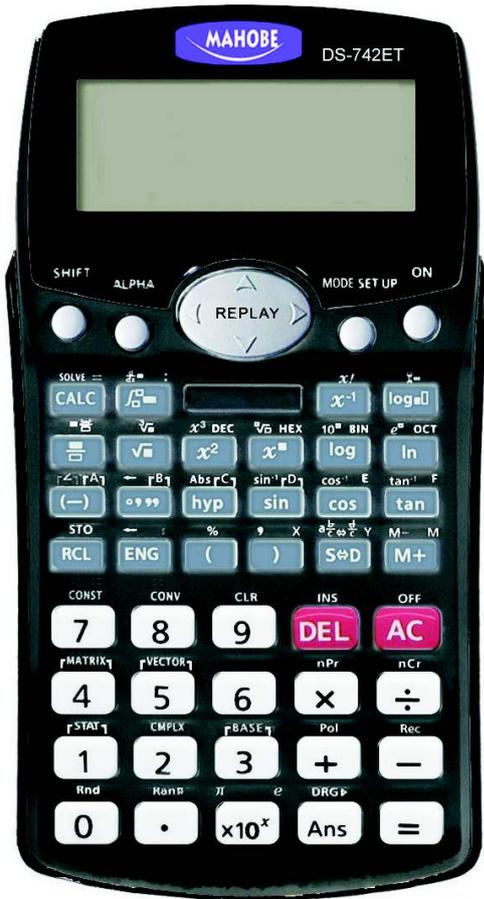
NAME _____ MATHS TEACHER _____

GEOMETRY		MEASUREMENT	
41		61	
42		62	
43		63	
44		64	
45		65	
46		66	
47		67	
48		68	
49		69	
50		70	
51		71	
52		72	
53		73	
54		74	
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NAME _____ MATHS TEACHER _____

STATISTICS																						
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The DS-742ET



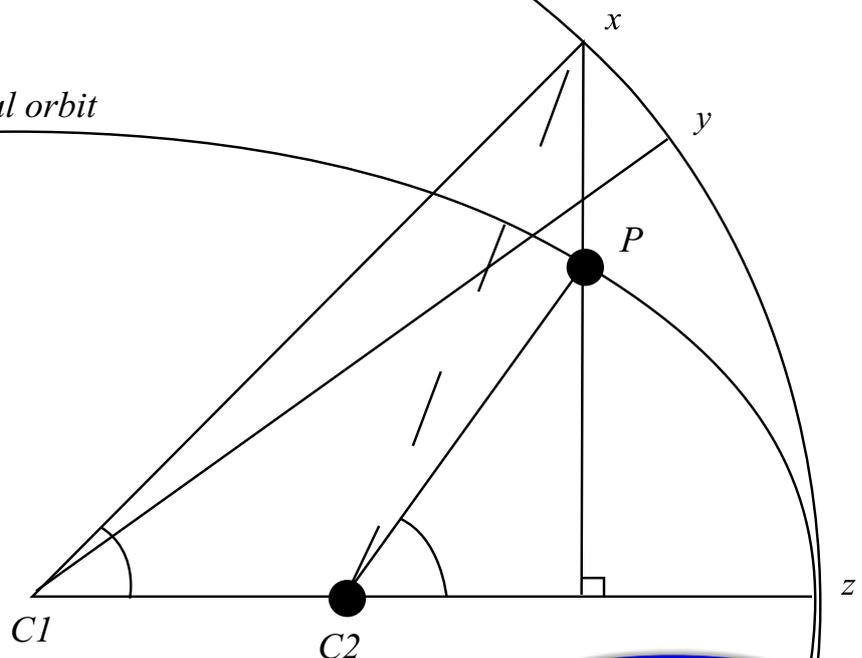
Some advanced technology has gone into the Mahobe DS-742ET to make it one of the most powerful calculators available.

If you use anything else then good luck!

eTOOL

planned orbit

actual orbit



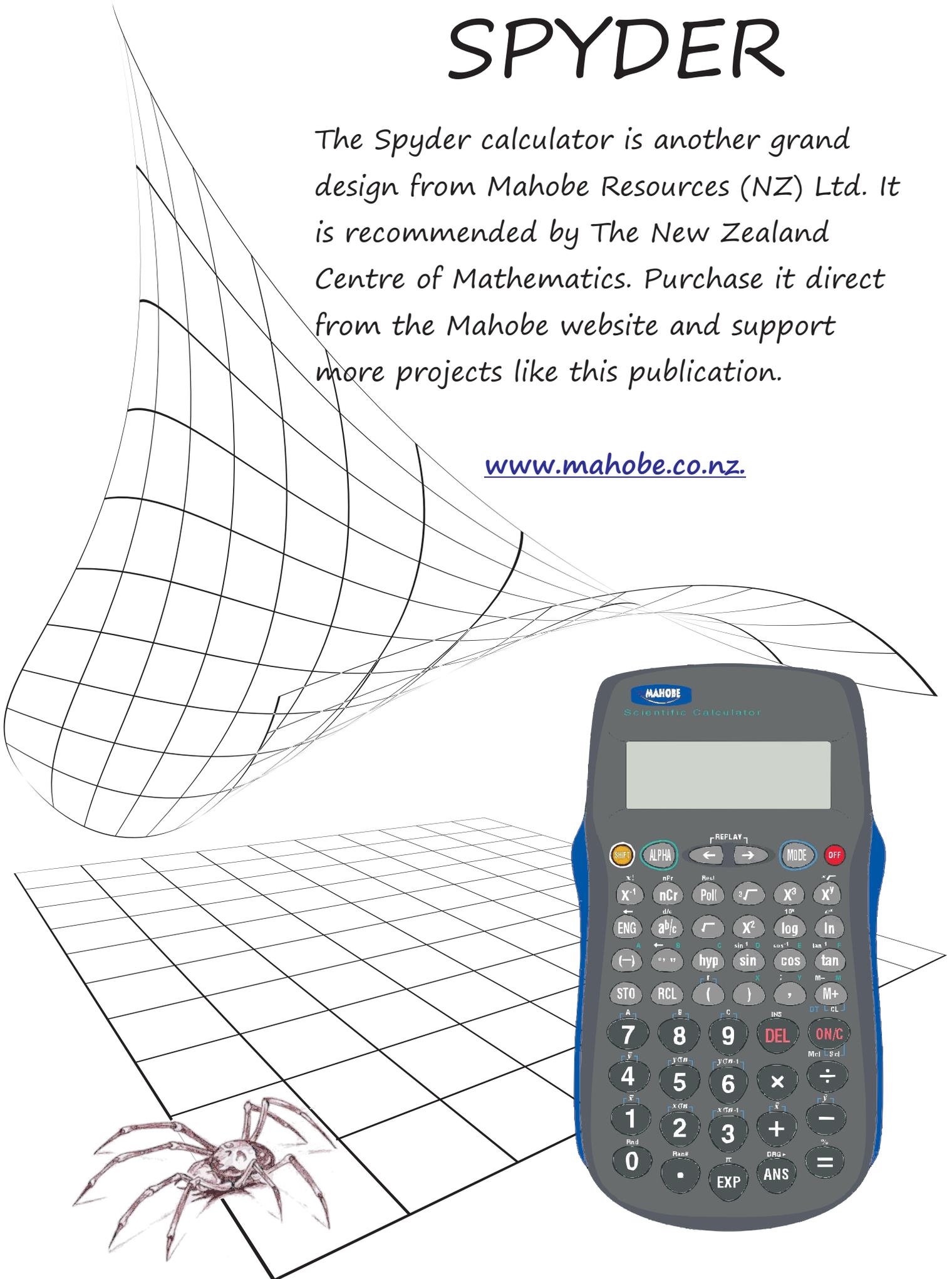
www.mahobe.co.nz



SPYDER

The Spyder calculator is another grand design from Mahobe Resources (NZ) Ltd. It is recommended by The New Zealand Centre of Mathematics. Purchase it direct from the Mahobe website and support more projects like this publication.

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YEAR 9 – TERM TWO EXAM

You will need a calculator, a pen and a ruler to do this exam.

DO NOT WRITE YOUR ANSWERS ON THIS PAPER.

NUMBER

1. Put in order, smallest to largest: 6.7062, 6.795, 6.686, 6.806, 6.815
2. $289.5 + 47.68 =$
3. $21.386 - 10.965 =$

Sarah won a Mahobe College 800m track race in a time of 5 minutes. She broke the previous record by 13.5 seconds.

4. What was the previous record?
5. How fast was Sarah running in km/h?
6. $1.5 \times 1.3 =$
 $6 \times 0.7 =$
 $0.008 \times 0.4 =$
 $7.0 \times 0.9 =$
7. $0.7 \times 10 =$
 $0.65 \times 100 =$
 $0.752 \times 1000 =$
 $0.009033 \times 1000 =$

Money

Foreign exchange rates (Buy note as at June 29)

Australia 0.7712

United States 0.8057

Japan 65.19

How much foreign currency will you receive when you change:

8. NZ\$800 to US dollars?
9. NZ\$1500 to Australian dollars?
10. NZ\$25,000 to Japanese yen?

11. $80.9 \div 10 =$
 $0.178 \div 100 =$
 $0.08235 \div 0.25 =$
 $(53.15 + 0.0035) \div 0.025 =$
12. Debbie buys 9 Cokes for \$6.12. What does one Coke cost?
13. If 10 students catch 25 fish in 10 days, how many fish will 20 students catch in 20 days?

Round your answer sensibly

14. A 65m length of kite string is cut into 11 equal pieces. How long is each piece?

Integers

The temperature at midnight is -11°C . What will the new temperature be if...

15. ...it falls by 5°C at 1am?
16. ...it rises by 9°C at 2am?

Write in order from smallest to largest:

17. $-339, +472, -832, -472, -369$

Calculate

18. $+6 + -7 + -4 + +14 =$
19. $-8 \times +4 =$
20. $4 \times -6 \times -7 \times -7 =$

ALGEBRA

*If $x = 4$ and $y = 10$
Find the value of:*

21. $\frac{x}{2} + 10 =$
22. $xy - 3 =$

23. $\frac{x + 26}{y} =$

24. $\frac{3x + 16}{x + y} =$

Write these in full:

25. m^2k^3

26. az^4

Write in index form:

27. $5m \times m$

28. $4b \times 3b \times 20b$

If $x = 5$ and $y = 8$

Work out these:

29. $5x^2 =$

30. $(5x)^2 =$

31. $5y^2 - 3x^2 =$

Simplify these:

32. $m \times m^3 \times m^4 =$

33. $b \times 8b^5 \times 2b^6 =$

34. $s^{10} \div s^6 =$

35. $\frac{32m^{12}}{4m^6} =$

Solve these equations:

36. $x + 31 = 47$

37. $x - 213 = 34$

38. $7x = 3x + 24$

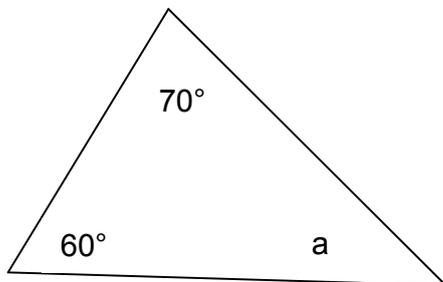
39. $15x = 7x + 160$

40. $7x - 14 = 35$

GEOMETRY

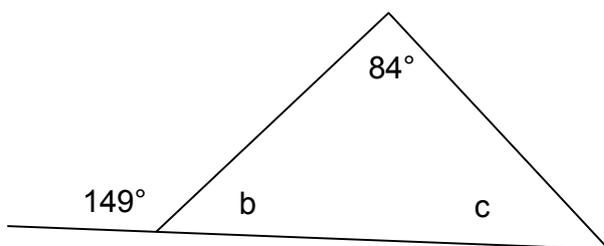
Work out the missing angles:

41. $a =$

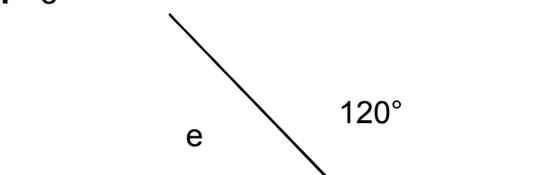


42. $b =$

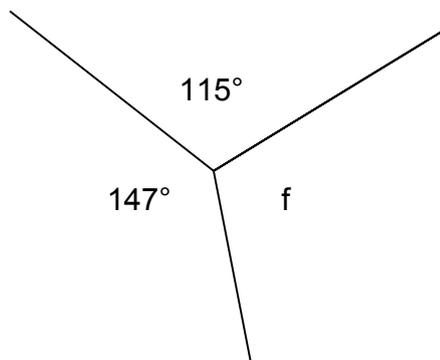
43. $c =$



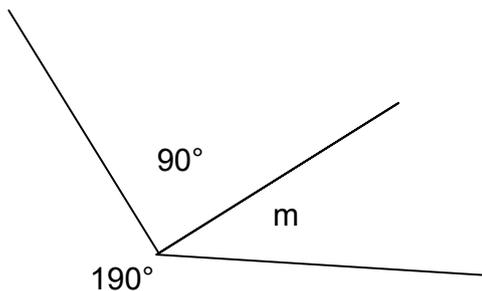
44. $e =$



45. $f =$



46. $m =$



True or False..?

- 47. Angles at a point add to 360° .
- 48. Angles in a triangle add to 280° .
- 49. Vertically opposite angles are equal.
- 50. When a line is reflected it is longer.
- 51. The angle of rotation tells you the size of the image.
- 52. In rotation there is sometimes only one invariant point.
- 53. In reflection there are many invariant points.
- 54. In translation there are no invariant points.
- 55. We use vectors to describe translations.

PROBLEM SOLVING

- 56. Complete the next four in the sequence 1, 2, 4, 7, 11, __, __, __, __
- 57. I am a whole number less than 50, when you add my digits you get 5, I am an even number and I am divisible by 8. What number am I?
- 58. I buy 3 chocolate bars. The total value is \$12. Each chocolate bar is worth 50 cents more than the other. What does each chocolate bar cost?
- 59. How many times would I write the digit 3 if I wrote all the numbers from 1 to 200?
- 60. You multiply me by 6, subtract 7 and the result is 59. What number am I?

MEASUREMENT

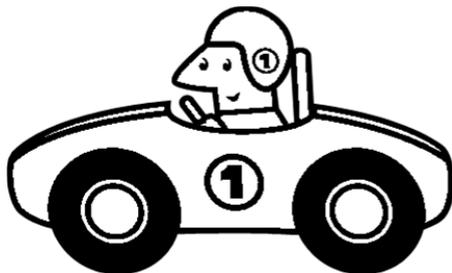
Change these lengths to mm:

61. 9cm
45cm
130cm
84cm

62. 1.2m
2.5m
0.85m
0.07m

63. John swims 50 lengths of a swimming pool. The pool is 50m long. How many km does he swim?

The scale of this toy car is 1:4.



64. How wide is a wheel in cm?
65. How long is this toy car in mm?
66. A train takes 8 hours to travel 400km. What is its average speed?
67. A speedboat travels for $5\frac{1}{2}$ hours at an average speed of 70km/h. What distance does it travel?

What is the distance travelled in each of the following journeys?

68. 5 hours at an average speed of 40km/h.
69. $4\frac{1}{2}$ days at an average speed of 40km/h.
70. 15 minutes at an average speed of 850km/h.

Choose from milligrams, grams, kilograms, tonnes. Which **unit of mass** would be most suitable for each of the following:

- 71. A pack of cards?
- 72. Your school bag?
- 73. A logging truck?
- 74. An eyelash?

Change these to tonnes:

- 75. 32000kg
- 154.2kg
- 950kg

Change these to kg:

- 76. 3000g
- 6455g
- 850g

At a wool auction, merino fleece sells for \$1800 per tonne. Calculate the cost of:

- 77. 1kg
- 300kg
- 7.3kg

Liquids

How many litres in:

- 78. 3000mL
- 32.5mL
- 750mL

How many millilitres in:

- 79. 3L
- 1.16L
- 0.25L

- 80. Soft drink cans hold 333mL and plastic bottles hold 2L. How many cans hold the same amount as 4 x 2L bottles?

STATISTICS

Construct a **stem and leaf** display for this set of data. These are results for the Mahobe College Clay Target Team.

74, 68, 65, 84, 91, 67, 78, 77, 81, 69, 90, 84, 72, 71, 63, 58, 66, 73, 67, 94, 73, 61, 72, 75, 64

(Your answer should include each of the following.)

81. Stem
 82. Leaf 1
 83. Leaf 2
 84. Leaf 3
 85. Leaf 4
 86. Leaf 5
-

Construct a **line graph**.

During Fundraising Week, students collected money for the Christchurch Emergency Fund. The money was counted each day and here is the set of data.

Day	Dollars (\$)
Monday	25
Tuesday	50
Wednesday	150
Thursday	350
Friday	200
Saturday	50
Sunday	25

(Your answer should include each of the following.)

87. Title
88. Y-axis
89. X-axis
90. Y-axis label
91. X-axis label
92. Plotting data line

Construct a **frequency table**.

Over the last 45 days Michael delivered parcels after school. He kept a daily record of the number of parcels he delivered. This is his record:

7, 6, 6, 3, 4, 6, 5, 2, 3, 4, 6, 6, 2, 7, 3,
3, 4, 6, 1, 5, 5, 6, 3, 4, 2, 6, 5, 5, 5,
3, 6, 4, 5, 5, 4, 5, 3, 6, 2, 3, 4, 5, 6, 5

(Your answer should include each of the following.)

- 93. Title
 - 94. Number column
 - 95. Tally column
 - 96. Frequency column
-

Data set: 13, 19, 23, 23, 28, 34, 38, 69, 73

- 97. What is the median?
 - 98. What is the mode?
 - 99. What is the mean?
 - 100. What is the range?
-

NAME _____ MATHS TEACHER _____

NUMBER		ALGEBRA	
1		21	
2		22	
3		23	
4		24	
5		25	
6		26	
7		27	
8		28	
9		29	
10		30	
11		31	
12		32	
13		33	
14		34	
15		35	
16		36	
17		37	
18		38	
19		39	
20		40	

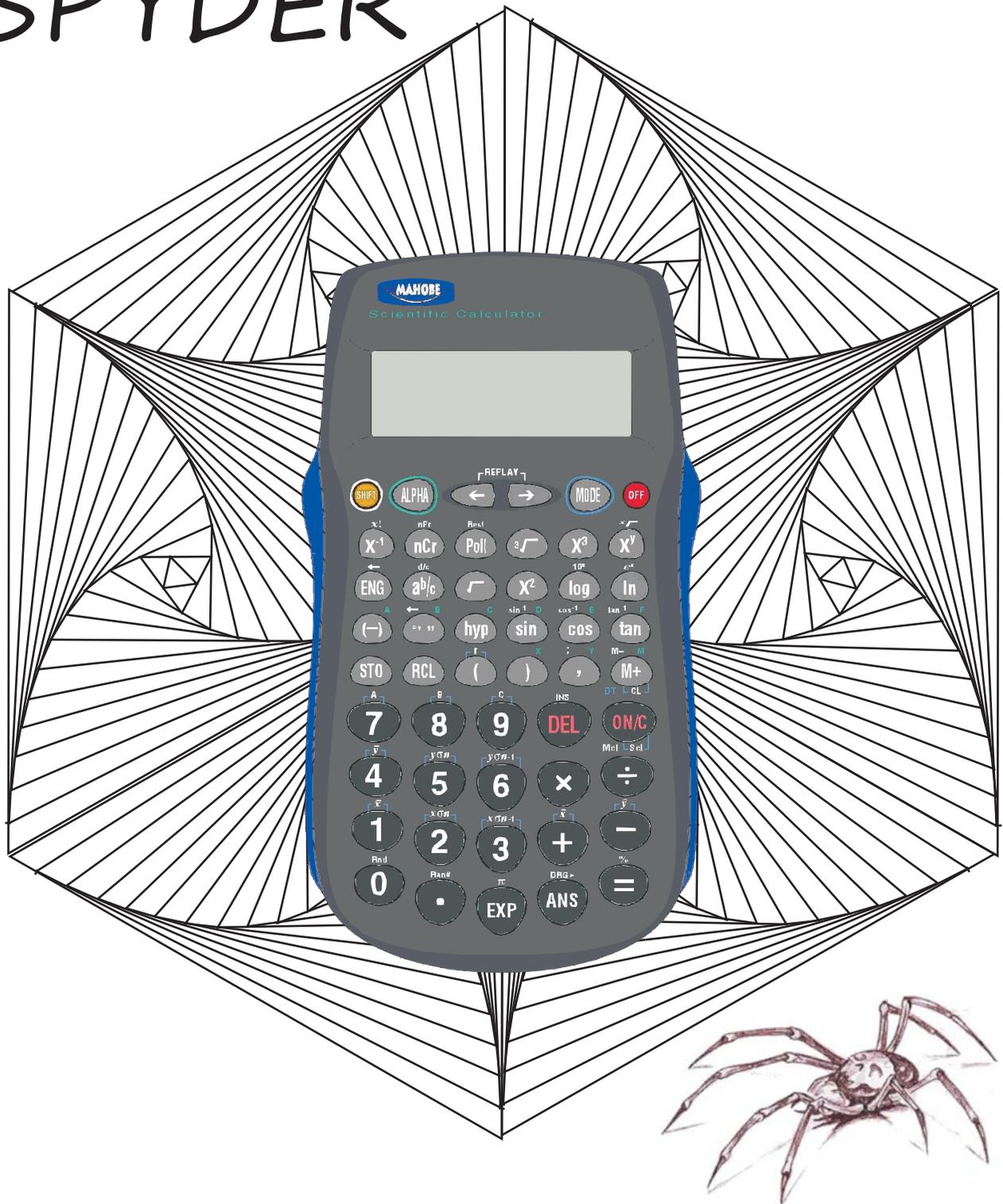
NAME _____ MATHS TEACHER _____

GEOMETRY		MEASUREMENT	
41		61	
42		62	
43		63	
44		64	
45		65	
46		66	
47		67	
48		68	
49		69	
50		70	
51		71	
52		72	
53		73	
54		74	
55		75	
56		76	
57		77	
58		78	
59		79	
60		80	

NAME _____ MATHS TEACHER _____

STATISTICS																						
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SPYDER

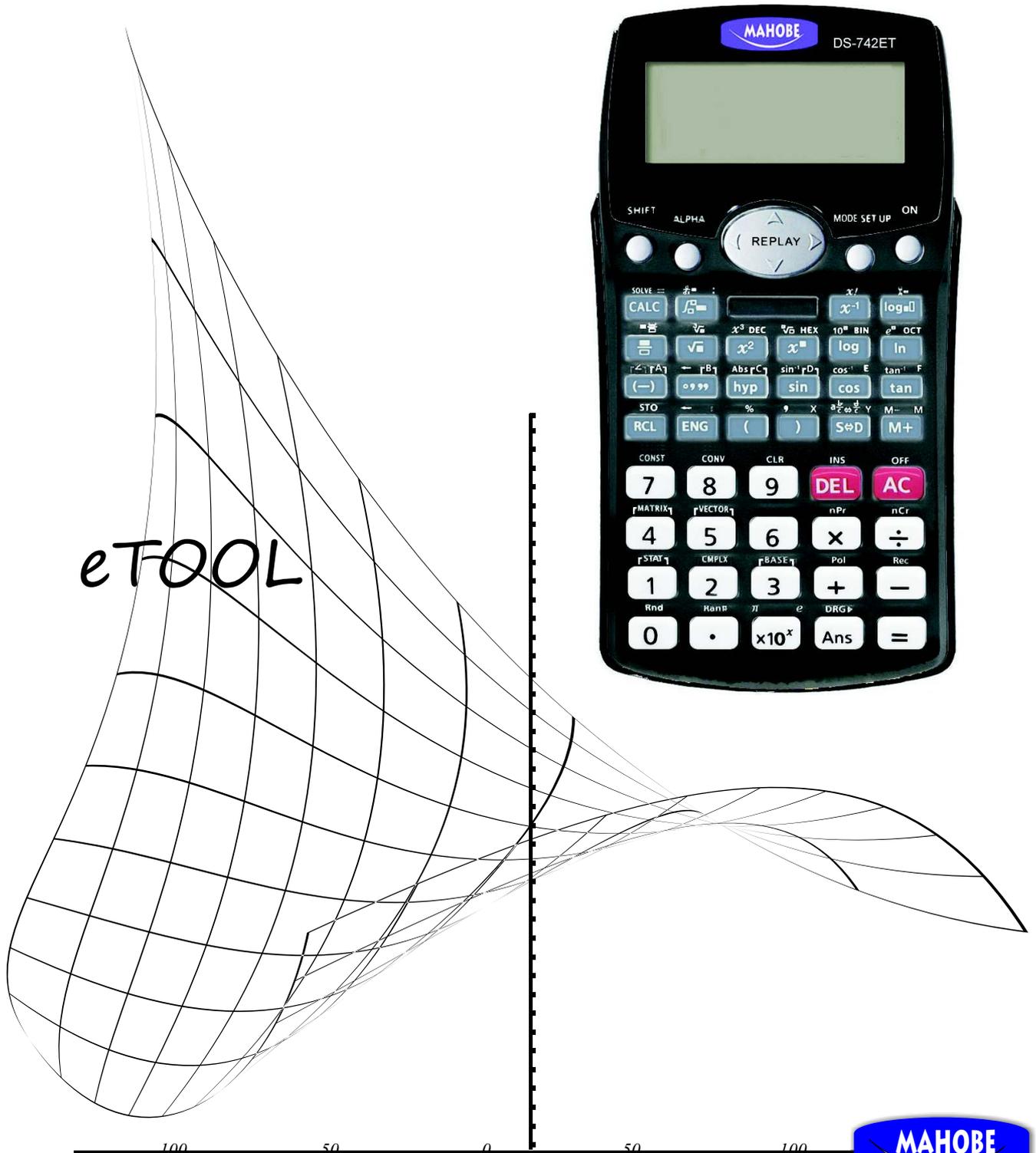


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www.mahobe.co.nz

The DS-742ET

Did you know that Mahobe added equation solving to make this an even more powerful calculator?



www.mahobe.co.nz

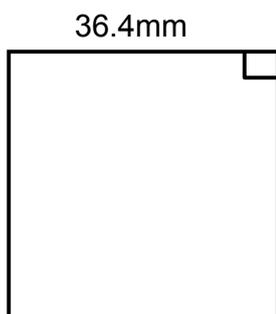
YEAR 9 – TERM THREE PRACTICE EXAM

You will need a calculator, a pen and a ruler to do this exam.

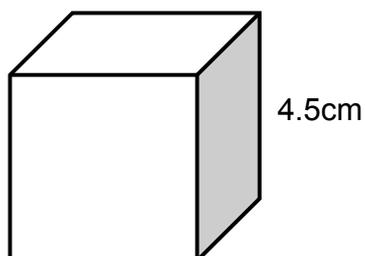
DO NOT WRITE YOUR ANSWERS ON THIS PAPER.

NUMBER

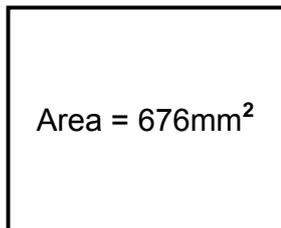
1. List the first 4 multiples of 19.
2. What is the Lowest Common Multiple of 15 and 20?
3. List the 4 common factors of 30 and 50.
4. What are the prime factors of 72?
5. Write this in power form: $7 \times 7 \times 7 \times 7 \times 7$
6. Write in full: 11^5
7. What is the base of: 15^4 ?
8. $(0.2)^4 =$
9. $(-5)^4 =$
10. Calculate the area of this square:



11. Calculate the volume of this cube:



12. Calculate the length of each side of this square:



Carpet squares. A square classroom has 81 carpet squares laid on the floor.

13. How many carpet squares touch the walls?
 14. How many carpet squares touch only one wall?

The product of 8 and 3 is added to 4

15. Write this statement with brackets.
 16. Work out the answer for this statement.

Fractions

17. There are 15 students in the school equestrian team. 3 students are in Year 13. What fraction is not in Year 13?

Angus kept a record of the weather at 9am at school each day for a whole week:

	<i>Mon</i>	<i>Tues</i>	<i>Wed</i>	<i>Thurs</i>	<i>Fri</i>	<i>Sat</i>	<i>Sun</i>
<i>Sky</i>	Snow	Hail	Cloudy	Fine	Fine	Showers	Showers
<i>Wind</i>	Windy	Windy	Calm	Calm	Windy	Windy	Calm
<i>Temperature (°C)</i>	4	6	9	12	10	7	6

18. What fraction of the days was fine?
 19. What fraction of the days had snow?
 20. What fraction of the days had temperatures lower than 10°C ?

ALGEBRA

Solve for x :

21. $x + 10 = 53$

22. $x - 100 = 61$

23. $\frac{x}{3} = 10$

24. $6x = 24$

25. $2x - 1 = 7$

26. $6x + 8 = x + 23$

27. $-5x + 6 = 21$

Fred is saving money for a \$200 rugby jersey. So far, he has saved x dollars. If he saves another \$112 he will have enough money.

28. Write an equation for this information.

29. Solve the equation to see how much he has saved.

30. The cost of a torch with batteries is \$12. The torch costs \$8 more than the batteries. How much do the batteries cost?

*Write an equation for the following information:
Do not solve!*

31. I think of a number and add 11 to it. This gives a result of 17.

Write this next equation and then solve for x :

32. I multiply a number by 2 and then add 7. This is the same as adding 9 to the number.

Peter is making hotdogs for his birthday party. He multiplies the number of guests by 3, and then subtracts 7. He makes 59 hotdogs. How many guests is he expecting?

33. Write an equation for the above information.

34. Now solve that equation.

Expand these brackets:

35. $5(p + q) =$

36. $-4(p + q) =$

37. $8(k-2) =$

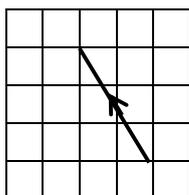
38. $m(p + q) =$

39. $a(b + c - d) =$

40. $5y(x + z) =$

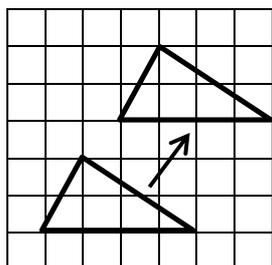
GEOMETRY

41. Write down the vector for:



42. Draw the arrow for the vector: $\begin{bmatrix} -3 \\ -5 \end{bmatrix}$

43. Write down the vector for this translation:



True or False

44. Parallel lines never meet.

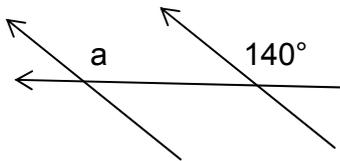
45. Parallel lines are sometimes the same distance apart.

46. A line that crosses a pair of parallel lines is called a transverse.

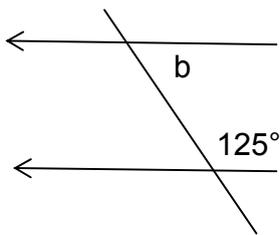
- 47. Corresponding angles always add up to 180° .
- 48. Cointerior angles always add up to 180° .
- 49. Bearings are angles which are measured clockwise from North.
- 50. Cartography means to draw carts.

Work out the size of the unknown marked angles:

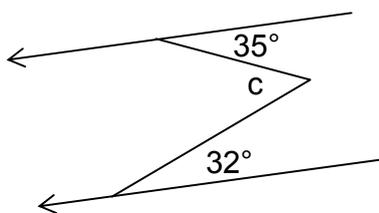
51.



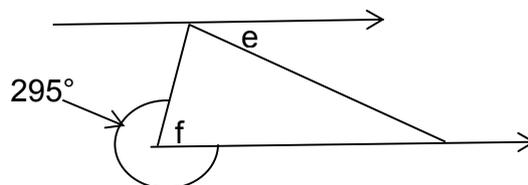
52.



53.

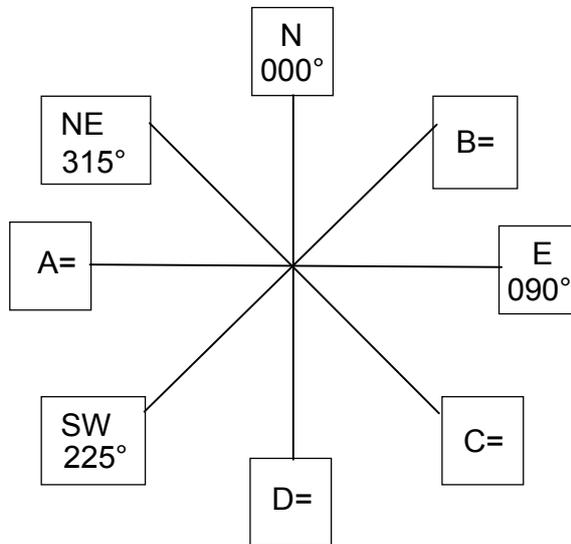


54. $e =$



55. $f =$

Each box should have a compass direction **and** a bearing:

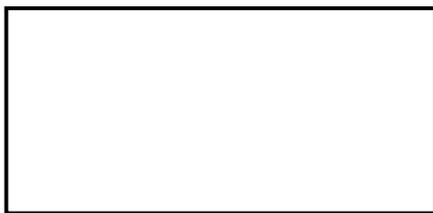


- 56. A =
- 57. B =
- 58. C =
- 59. D =
- 60. Which of these is a bearing?
a) 50° b) NW c) 450° d) 120°

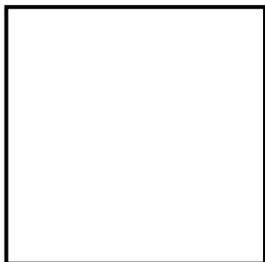
MEASUREMENT

Measure and calculate the areas of these shapes (Questions 61 - 70).

61. Rectangle



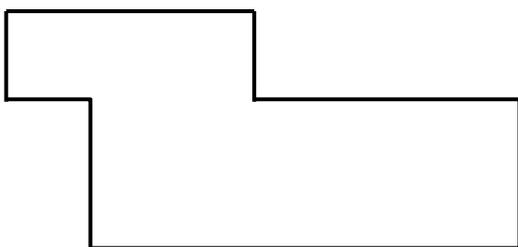
62. Square



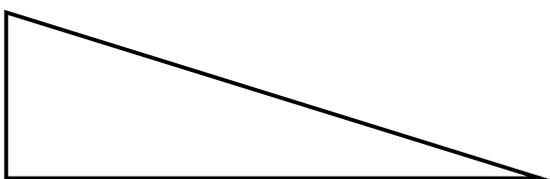
63.



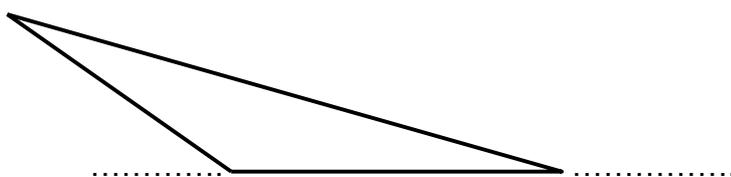
64.



65.



66.

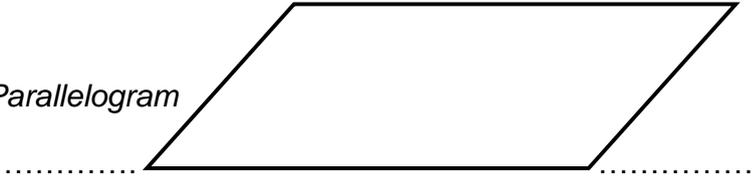


67.



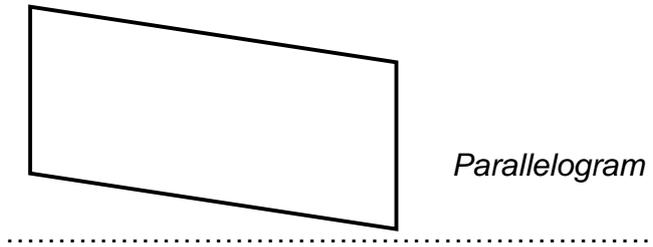
68.

Parallelogram

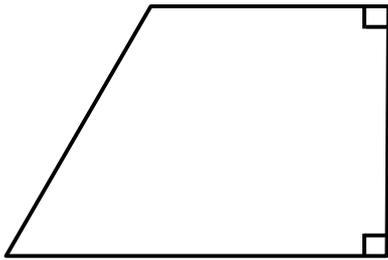


69.

Parallelogram

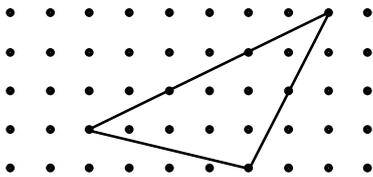


70.



Use Pick's rule – or your own rule – to work out the area of these 3 shapes:

71.

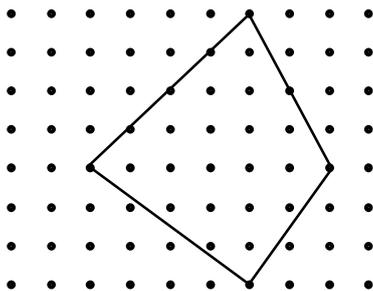


Pick's Rule: Area of shape = $n - 1 + \frac{p}{2}$

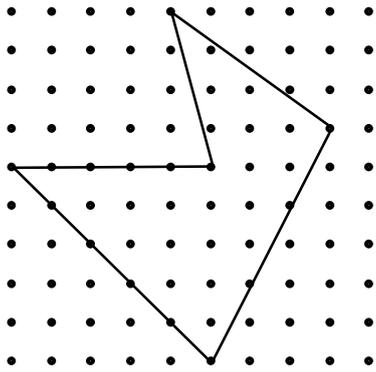
The rule just involves counting dots.

We use n for the number of dots inside the shape.
We use p for the number of dots on the perimeter.

72.



73.



Hectares

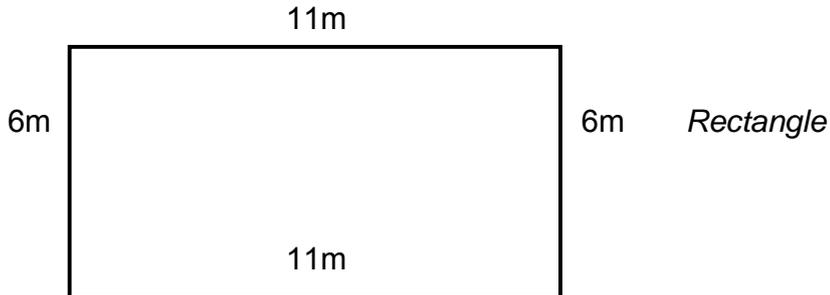
74. $4\text{ha} = \dots? \dots \text{m}^2$

75. $48500\text{m}^2 = \dots? \dots \text{ha}$

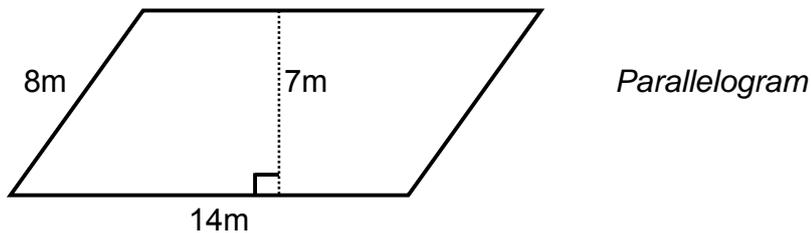
76. The land next to the school is being subdivided. It has an area of 7.4ha . Each section will be about 899m^2 . Approximately how many sections will there be?

Calculate the perimeter of these shapes:

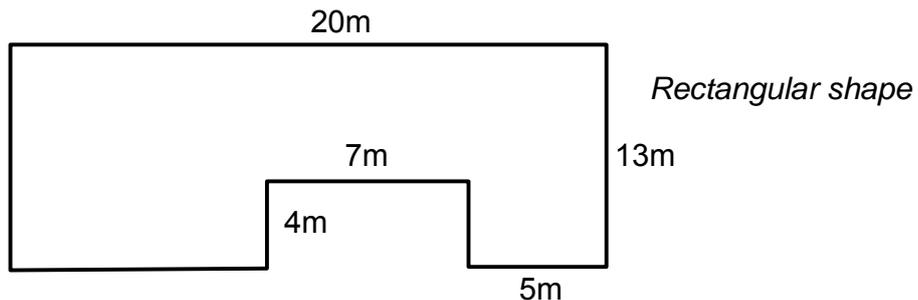
77.



78.



79.



80. Mahobe College has two rugby fields, one soccer field and one hockey field. The Council operates eight sports fields next door to the College. Each sport field is $50\text{m} \times 100\text{m}$. How many hectares are there in total for all these fields?

STATISTICS

[35, 37, 37, 40, 42, 45, 45, 45, 50]

81. What is the median?
82. What is the mode?
83. What is the mean?
84. What is the range?
-

This frequency table shows the speeding tickets issued yesterday.

Exceeding limit by:	Frequency
10kph	6
20kph	16
30kph	8
40kph	6
50kph	3
60kph	1
70kph	0

85. How many exceeded the limit by 40kph?
86. What is the frequency of 50kph?
87. What was the highest speed ticketed?
88. How many drivers exceeded the limit by at least 40kph?
89. How many drivers received a ticket for speeding?
90. What is the percentage of drivers below 30kph?

Limerick

*There once was a girl from Great Britain
Who carelessly sat on her kitten
Imagine her surprise
And the look in her eyes
When on the behind she was bitten!*

Construct a **frequency table** for the appearance of these 10 letters in this limerick:

91. z =

92. t =

93. n =

94. e =

95. a =

96. r =

97. s =

98. l =

99. i =

100. w =

Note to the student:

The end of term exam will be very similar to this paper.

If you study properly, it will be possible for you to get every question correct.

THIS IS YOUR GOAL!

Good luck!

NAME _____ MATHS TEACHER _____

NUMBER		ALGEBRA	
1		21	
2		22	
3		23	
4		24	
5		25	
6		26	
7		27	
8		28	
9		29	
10		30	
11		31	
12		32	
13		33	
14		34	
15		35	
16		36	
17		37	
18		38	
19		39	
20		40	

NAME _____ MATHS TEACHER _____

GEOMETRY		MEASUREMENT	
41		61	
42		62	
43		63	
44		64	
45		65	
46		66	
47		67	
48		68	
49		69	
50		70	
51		71	
52		72	
53		73	
54		74	
55		75	
56		76	
57		77	
58		78	
59		79	
60		80	

NAME _____ MATHS TEACHER _____

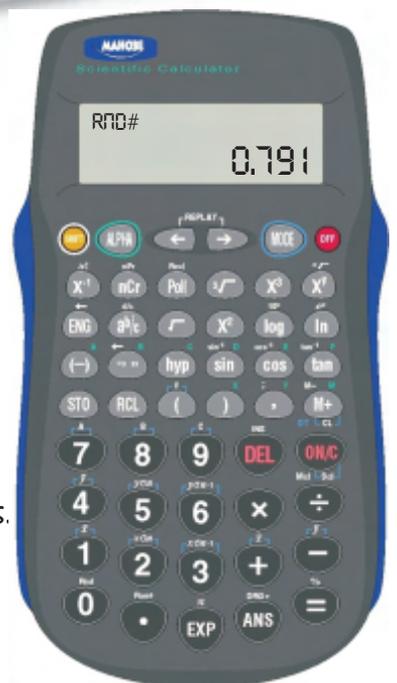
STATISTICS		
81		
82		
83		
84		
85		
86		
87		
88		
89		
90		
91		
92		
93		
94		
95		
96		
97		
98		
99		
100		



SPYDER

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www.mahobe.co.nz

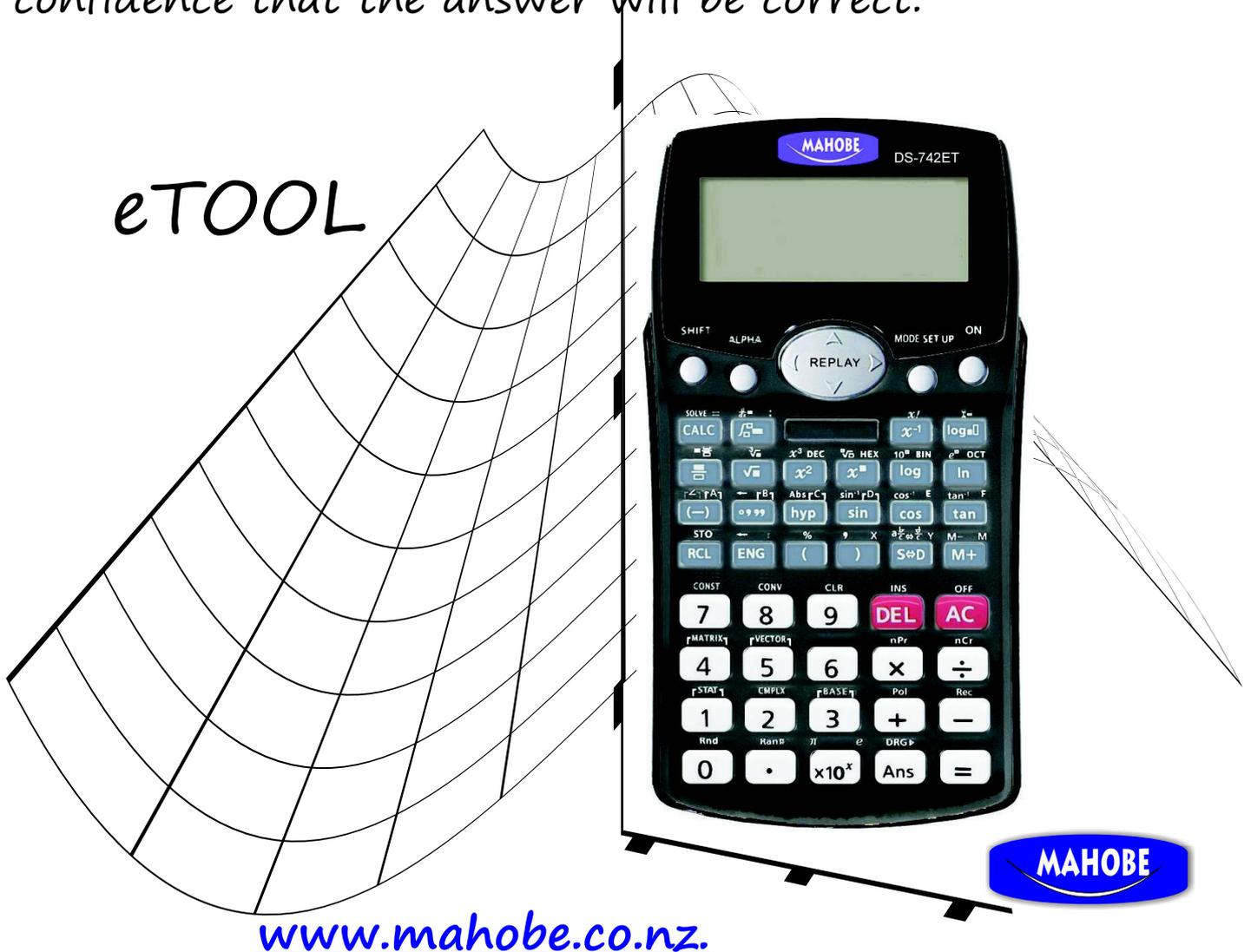


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- Improved powers and fraction display.

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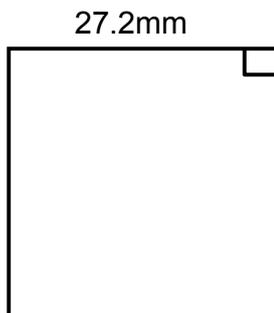
YEAR 9 EXAM –TERM THREE

You will need a calculator, a pen and a ruler to do this exam.

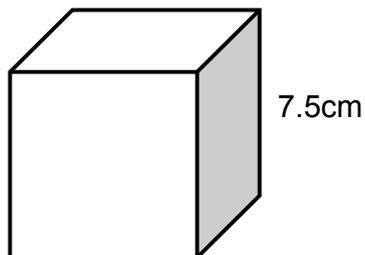
DO NOT WRITE YOUR ANSWERS ON THIS PAPER.

NUMBER

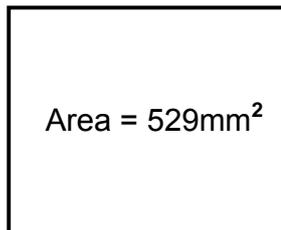
1. List the first 4 multiples of 91
2. What is the Lowest Common Multiple of 20 and 25?
3. List the 4 common factors of 30 and 50
4. What are the prime factors of 30?
5. Write this in power form: $9 \times 9 \times 9 \times 9 \times 9 \times 9$
6. Write in full: 13^6
7. What is the base of: 13^3 ?
8. $(0.3)^3 =$
9. $(-6)^3 =$
10. Calculate the area of this square:



11. Calculate the volume of this cube:



12. Calculate the length of each side of this square:



Carpet squares. A square classroom has 100 carpet squares laid on the floor.

13. How many carpet squares touch the walls?
 14. How many carpet squares touch only one wall?

The product of 8 and 4 is subtracted from 56

15. Write this statement with brackets
 16. Work out the answer for this statement

Fractions

17. There are 14 students in the school orienteering team. 4 students are in Year 13. What fraction of students is not in Year 13?

Angus kept a record of the weather at 9am at school each day for a whole week:

	<i>Mon</i>	<i>Tues</i>	<i>Wed</i>	<i>Thurs</i>	<i>Fri</i>	<i>Sat</i>	<i>Sun</i>
<i>Sky</i>	Snow	Hail	Cloudy	Fine	Fine	Snow	Showers
<i>Wind</i>	Windy	Windy	Calm	Calm	Windy	Windy	Calm
<i>Temperature (°C)</i>	4	6	9	12	10	7	11

18. What fraction of the days was fine?
 19. What fraction of the days had snow?
 20. What fraction of the days had temperatures lower than 10°C ?

ALGEBRA

Solve for x

21. $x + 10 = 71$

22. $x - 50 = 61$

23. $\frac{x}{3} = 31$

24. $6x = 72$

25. $2x - 1 = 33$

26. $6x + 8 = x + 63$

27. $-5x + 21 = 1$

Fred is saving money for a \$275 rugby jersey. So far, he has saved x dollars. If he saves another \$142 he will have enough money.

28. Write an equation for this information

29. Solve the equation to see how much he has saved.

30. The cost of a torch with batteries is \$48. The torch costs \$10 more than the batteries. How much do the batteries cost?

*Write an equation for the following information:
Do not solve!*

31. I think of a number and subtract 36 from it. This gives a result of 27.

Write this next equation and then solve for x

32. I multiply a number by 3 and then add 13. This is the same as adding 33 to the number.

Peter is making hotdogs for his birthday party. He multiplies the number of guests by 4, and then subtracts 28. He makes 100 hotdogs. How many guests is he expecting?

33. Write an equation for the above information.

34. Now solve that equation.

Expand these brackets:

35. $6(p + q) =$

36. $-3(p - q) =$

37. $7(k-2) =$

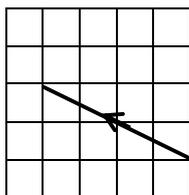
38. $t(r + s) =$

39. $d(e + f - k) =$

40. $6a(b + c) =$

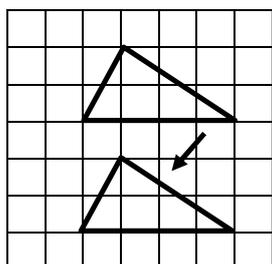
GEOMETRY

41. Write down the vector for:



42. Draw the arrow for the vector: $\begin{bmatrix} -5 \\ -1 \end{bmatrix}$

43. Write down the vector for this translation:



True or False

44. Parallel lines never meet

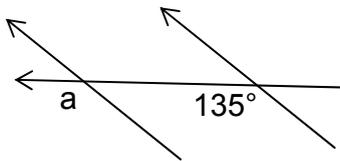
45. Parallel lines are sometimes the same distance apart

46. A line that crosses a pair of parallel lines is called a transverse

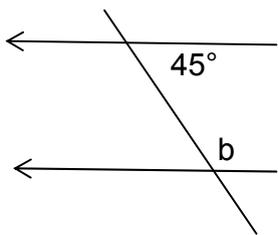
- 47. Corresponding angles sometimes add up to 180°
- 48. Cointerior angles sometimes add up to 180°
- 49. Bearings are angles which are measured clockwise from South
- 50. Cartography means to draw maps

Work out the size of the unknown marked angles:

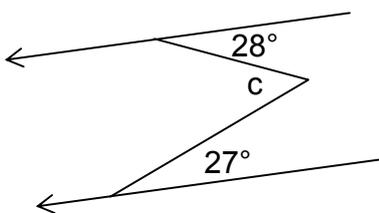
51.



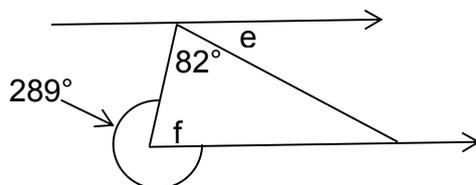
52.



53.

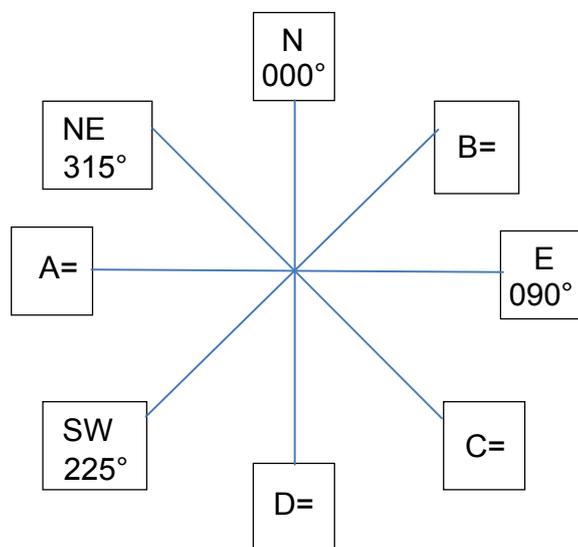


54. $e =$



55. $f =$

What compass directions **and** bearings are missing?



56. A =

57. B =

58. C =

59. D =

60. Which three of these is a bearing?

- a) 150° b) SE c) 380° d) 20°
-

YEAR 9 EXAM –TERM THREE

You will need a calculator, a pen and a ruler to do this exam.

DO NOT WRITE YOUR ANSWERS ON THIS PAPER.

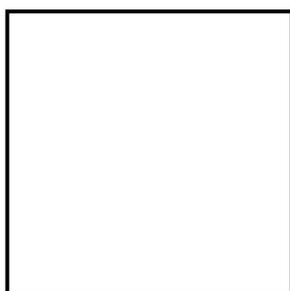
MEASUREMENT

Measure and calculate the areas of these shapes (Questions 61 - 70)

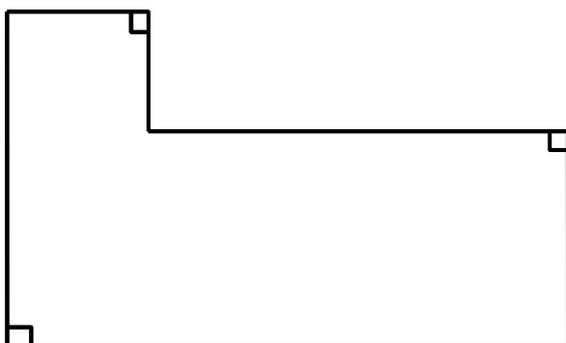
61. *Rectangle*



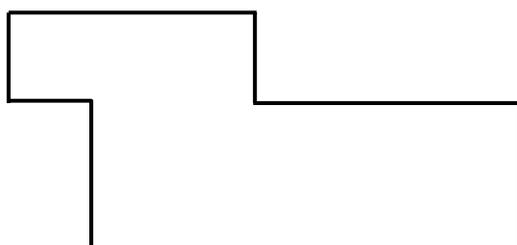
62. *Square*



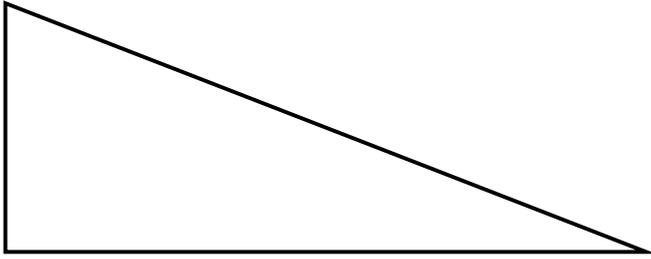
63.



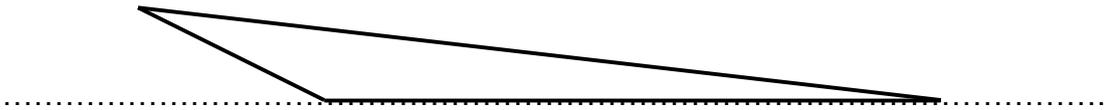
64.



65.



66.



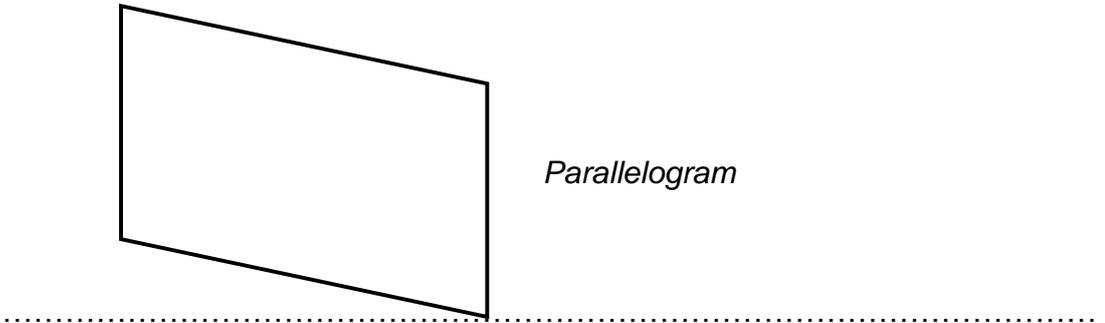
67.



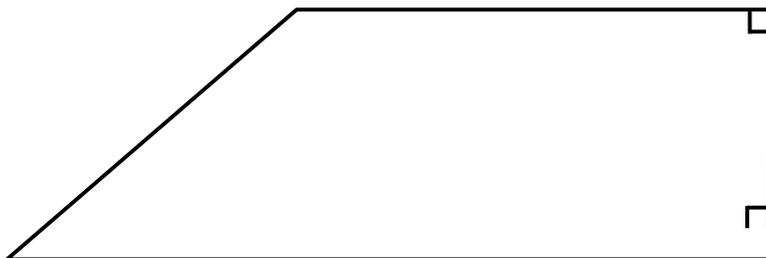
68.



69.



70.



Pick's Rule: Area of shape = $n - 1 + \frac{p}{2}$

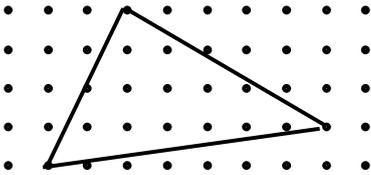
The rule just involves counting dots.

We use n for the number of dots inside the shape.

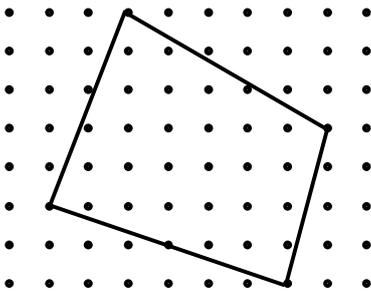
We use p for the number of dots on the perimeter.

Use Pick's rule – or your own rule – to work out the area of these 3 shapes:

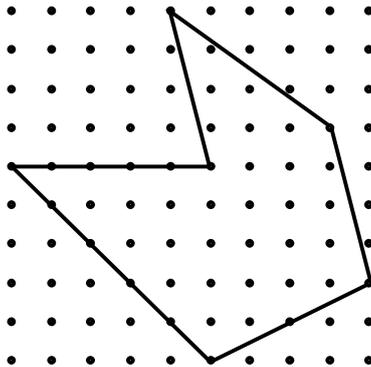
71.



72.



73.



Hectares

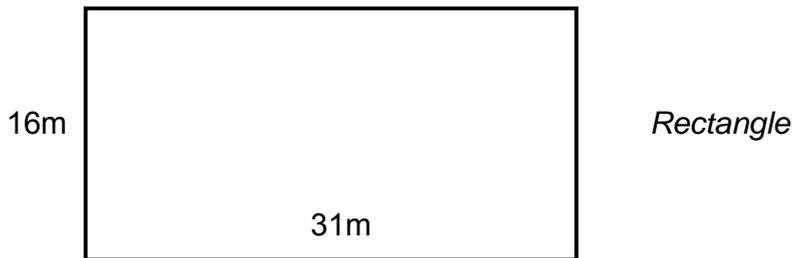
74. 8ha = ...?... m²

75. 68,000m² = ...?... ha

76. The land next to the school is being subdivided. It has an area of 9.5ha. Each section will be about 900m². Approximately how many sections will there be?

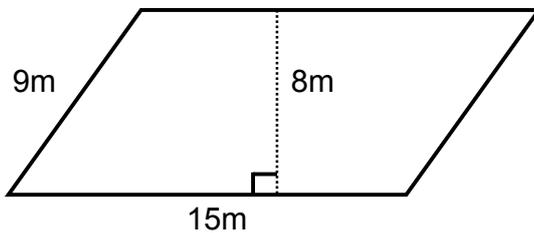
Calculate the perimeter of these shapes:

77.



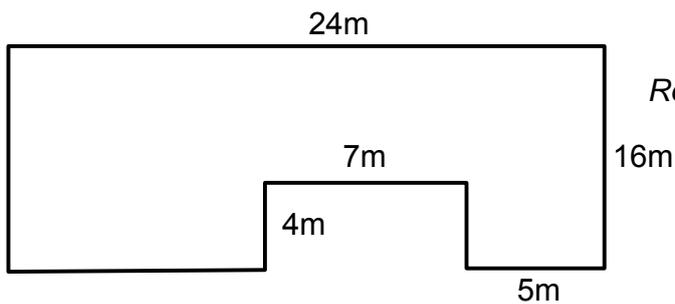
Rectangle

78.



Parallelogram

79.



Rectangular shape

80. Mahobe College has three rugby fields, one soccer field and one hockey field. The Council operates twelve sports fields next door to the College. Each field is $50\text{m} \times 100\text{m}$. How many hectares is that?

STATISTICS

41, 43, 43, 46, 48, 51, 51, 51, 56

- 81.** What is the median?
- 82.** What is the mode?
- 83.** What is the mean?
- 84.** What is the range?

This frequency table shows the speeding tickets issued yesterday.

Exceeding limit by:	Frequency
10kph	6
20kph	16
30kph	8
40kph	6
50kph	3
60kph	1
70kph	0

- 85.** How many exceeded the limit by less than 40kph?
 - 86.** What is the frequency of 20kph?
 - 87.** What was the highest speed ticketed?
 - 88.** How many drivers exceeded the limit by at least 30kph?
 - 89.** How many drivers received a ticket for speeding?
 - 90.** What is the percentage of drivers above 30kph?
-

Limerick

There was an old man from Darjeeling

Who rode on the night train to Ealing

It said on the door:

“Don’t spit on the floor”

So he carefully spat on the ceiling

Construct a **frequency table** for the appearance of these 10 letters in this limerick:

91. z =

92. t =

93. n =

94. e =

95. a =

96. r =

97. s =

98. l =

99. y =

100. w =

NAME _____ MATHS TEACHER _____

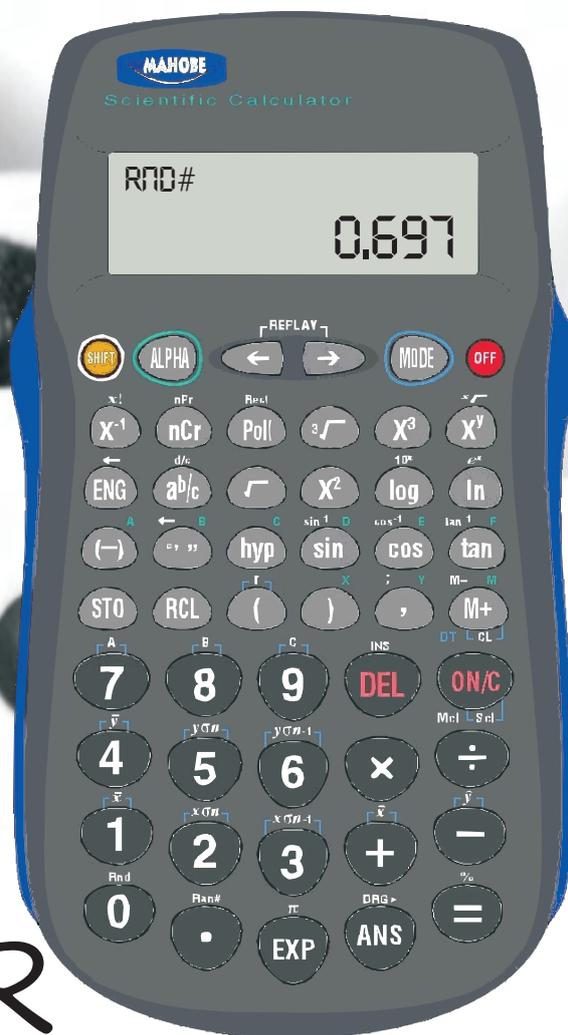
NUMBER		ALGEBRA	
1		21	
2		22	
3		23	
4		24	
5		25	
6		26	
7		27	
8		28	
9		29	
10		30	
11		31	
12		32	
13		33	
14		34	
15		35	
16		36	
17		37	
18		38	
19		39	
20		40	

NAME _____ MATHS TEACHER _____

GEOMETRY													
41													
42	<table border="1"> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>												
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NAME _____ MATHS TEACHER _____

MEASUREMENT		STATISTICS			
61		81			
62		82			
63		83			
64		84			
65		85			
66		86			
67		87			
68		88			
69		89			
70		90			
71		91	Letter	Tally	Frequency
72		92			
73		93			
74		94			
75		95			
76		96			
77		97			
78		98			
79		99			
80		100			



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NAME: _____ [First name & Family name]

Assessor's
use only

TEACHER: _____

Year 9 Mathematics

You should answer ALL parts of ALL questions in this exam paper.

You should show ALL working.

Check that this booklet has the pages in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO YOUR TEACHER AT THE END OF THE ALLOTTED TIME.

<i>For Assessor's use only</i>	Achievement Criteria	
Achievement	Achievement with Merit	Achievement with Excellence
Apply algebraic procedures in solving problems. <input type="checkbox"/>	Apply algebraic procedures involving relational thinking, in solving problems. <input type="checkbox"/>	Apply algebraic procedures involving extended abstract thinking, in solving problems. <input type="checkbox"/>
Overall Level of Performance		<input type="checkbox"/>

SECTION 1: Number problems in context

You are advised to spend 20 minutes answering the questions in this section.

QUESTION ONE

Jason buys a tray of peaches. He gives $\frac{1}{4}$ of the tray to Mrs Jones and takes $\frac{1}{3}$ of the tray to school. What fraction does he leave at home?

QUESTION TWO

The school clay target team travelled to a competition in Sydney. The cost for plane tickets and accommodation was \$4260. The plane tickets cost \$2200. What percentage of the cost was for accommodation?

QUESTION THREE

A "C" category ticket to the Rugby World Cup semi-finals costs \$750.

- (i) That same ticket would have cost 35% less at the quarter-finals. How much would that have been?

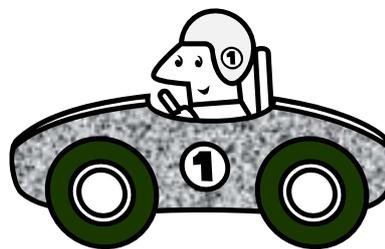
- (ii) But for the finals, this same ticket is increased by 55%. How much will the ticket cost for the finals?

QUESTION FOUR

Two different car dealers are selling the same model car.

Honest Harry is advertising his car as "\$18,000 with 35% discount".

Gentleman Jim advertises his car as "\$15,000 with 20% discount".



- (i) Which car is cheaper?

- (ii) By how much is it cheaper?

QUESTION FIVE

Mars orbits the sun at an average distance of 227,939,100 km.

Earth orbits the sun at an average distance of 149,597,888 km.

An astronomical unit (AU) is the distance from Earth to the Sun.

Light and radio waves travel at 299,792, 458 m/s.

- (i) How far is Mars from Earth?

- (ii) How many AUs from Mars to the Sun?

- (iii) How long would it take a particle of light to travel from Earth to Mars and back?

QUESTION SIX

Money is exchanged at three different banks.

Jason changed his NZ\$210 and got US\$175.

Darts changed her NZ\$450 and got US\$369.

Pele changed his NZ\$65 and got US\$54.

- (i) The exchange rate at Jason's bank was 0.8333. Write down the sum that shows how this could be calculated to give Jason his US\$175.

- (ii) Who got the best exchange rate? Explain and show your working.

SECTION 2: Apply Algebraic Procedures in Solving ProblemsAssessor's
use only

You are advised to spend 30 minutes answering the questions in this section.

QUESTION ONE

(a) Solve these equations:

(i) $x + 13 = 46$

(ii) $x^2 = 81$

(b) Solve $5x - 10 = 3x + 12$

(c) (i) Factorise $4x + 4y$

(ii) Simplify $4a + 3b - 2a + b$

(d) Show that $\sqrt{x^4} = x^2$

Assessor's
use only

QUESTION TWO

(a) Michelle found the following formula:

$$A = bh$$

(i) If $b = 8$ and $h = 20$, find A .

A =

(ii) Michelle now wants to use the same formula to find h in a different situation.

She knows that $A = 30$ and $b = 6$.

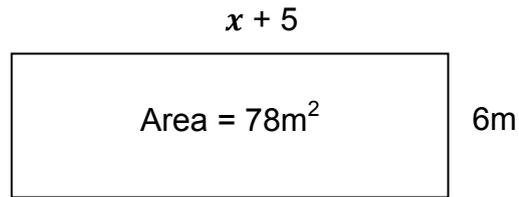
h =

(b) (i) Expand: $2(x + 3)$

(ii) Solve: $2(3 - x) = -8$

x =

- (c) Anaru has to mow the back lawn. This is what it looks like.



- (i) Write an equation for the perimeter of the lawn.

- (ii) Write an equation for the area of the lawn.

- (iii) What is the value of x ?

$x =$

QUESTION THREE

- (a) Solve: $3(x+4)=0$

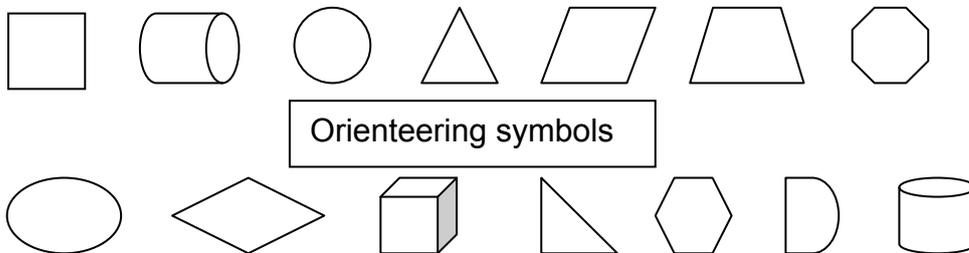
$X =$

- (b) Simplify: $3x^2 + 2x + 4x^2 - x$

SECTION 3: Apply geometric reasoning in solving problems

You are advised to spend 30 minutes answering the questions in this section.

QUESTION ONE



ORIENTEERING COURSE

You have to draw a map for orienteers to follow.

Each square on your map grid is counted as 100m.

There are 12 “legs”.

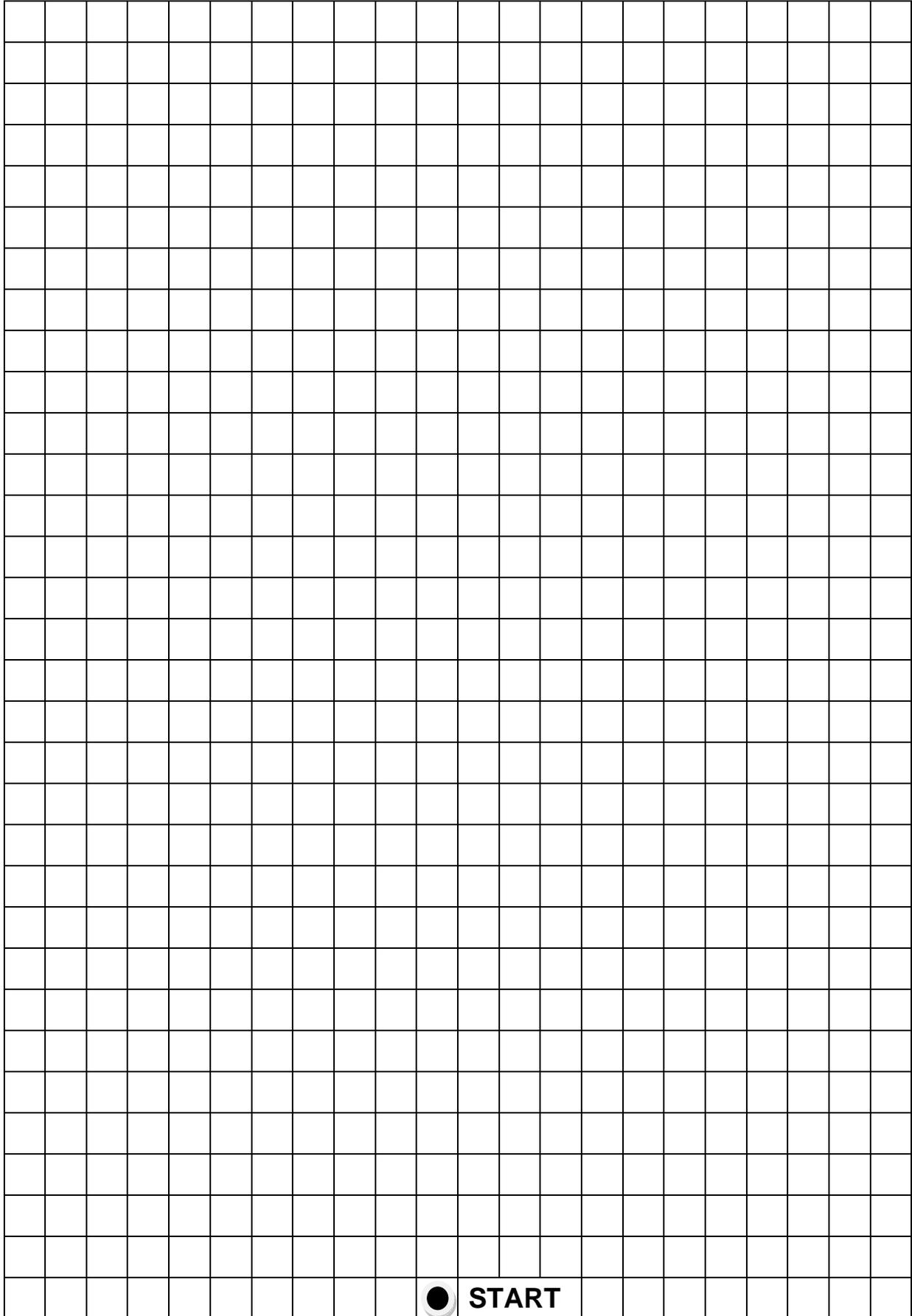
At the end of each leg you must draw a symbol – taken from the set above.

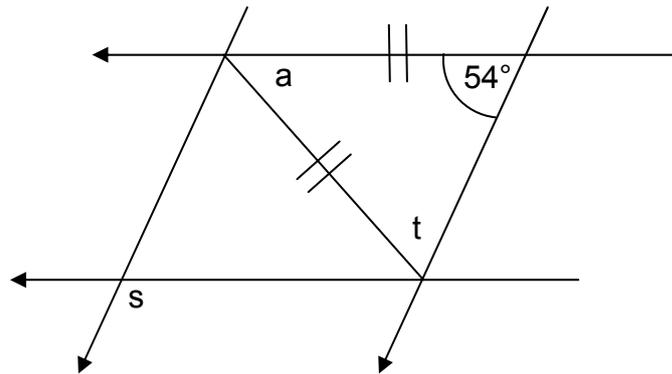
Instructions on how to draw the map:

- 1 From the START move 200m on a bearing of 000° - draw a square
- 2 Move 600m on a bearing of 090° - draw a horizontal cylinder
- 3 Move 500m on a bearing of 000° - draw a circle
- 4 Move 400m on a bearing of 270° - draw a trapezium
- 5 Move 200m on a bearing of 315° - draw a diamond
- 6 Move 300m on a bearing of 045° - draw a right-angled triangle
- 7 Move 400m on a bearing of 090° - draw a vertical cylinder
- 8 Move 400m on a bearing of 315° - draw a hexagon
- 9 Move 500m on a bearing of 000° - draw an octagon
- 10 Move 400m on a bearing of 225° - draw an ellipse
- 11 Move 600m on a bearing of 180° - draw a parallelogram
- 12 Move 300m on a bearing of 270° - draw a cube

ORIENTEERING MAP

Assessor's
use only



QUESTION TWO

(i) $t =$

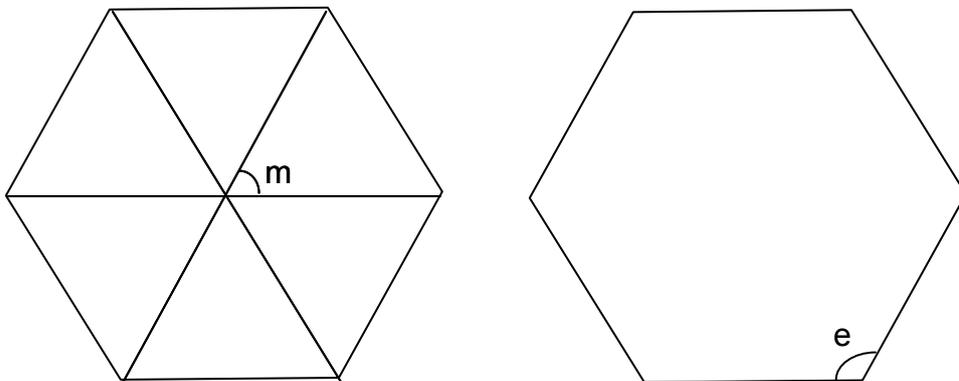
(ii) $a =$

(iii) $s =$

QUESTION THREE

Here are two regular hexagons:

[CLUE: The exterior angles of any polygon add up to 360° .]



(i) Using your knowledge of hexagons, work out the size of angle “e”

(ii) Write an equation to show why “m” equals 60°

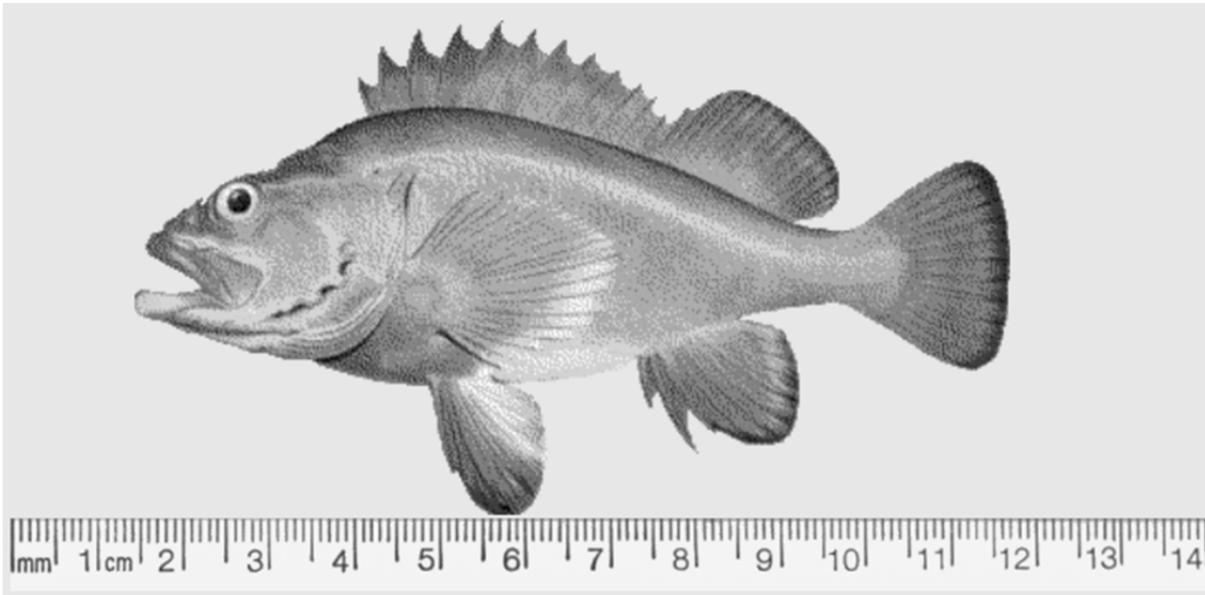
- (iii) Each side of a hexagon makes an angle of 60° at the centre. How many sides would a polygon have if the angle at the centre was 18° ?

Assessor's
use only

SECTION 4: Solve problems involving measurement

You are advised to spend 20 minutes answering the questions in this section.

QUESTION ONE



- (i) How long is this goldfish?

- (ii) How "tall" is it?

- (iii) Rare goldfish are often sold by size. This one costs \$5.00 per 8cm^2 . Estimate how much will it sell for.

QUESTION TWO

Assessor's
use only

[Note: The distance by road from Ramarama to Bombay is approximately 5km.]

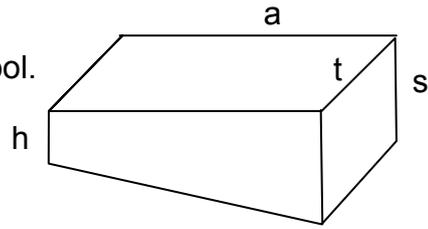
- (i) What is the flying distance from Waiuku to Awhitu?

- (ii) Estimate the distance by road from Manurewa to Maramarua.

- (iii) Estimate the area of the Hunua Ranges in square kilometres. Show your calculations.

QUESTION THREE

This is a really bad drawing of the Mahobe swimming pool. It is 30m long, 8m wide and 1m at the shallow end. The bottom of the pool slopes down to 3m.



(i) What are the measurements marked h , a , t , s on this drawing?

$h =$ _____ $a =$ _____

$t =$ _____ $s =$ _____

(ii) Calculate the area of the cross-section of the pool.

(iii) Watercare Ltd sells water for $\$1.64/m^3$. How much does the Council have to pay to fill the pool?

SECTION 5: Sketch and interpret graphs

You are advised to spend 20 minutes answering the questions in this section.

QUESTION ONE

Mahobe College students have been fundraising for Canteen. The Stem and Leaf graph shows the distribution of how much money was collected by the students of one form class.

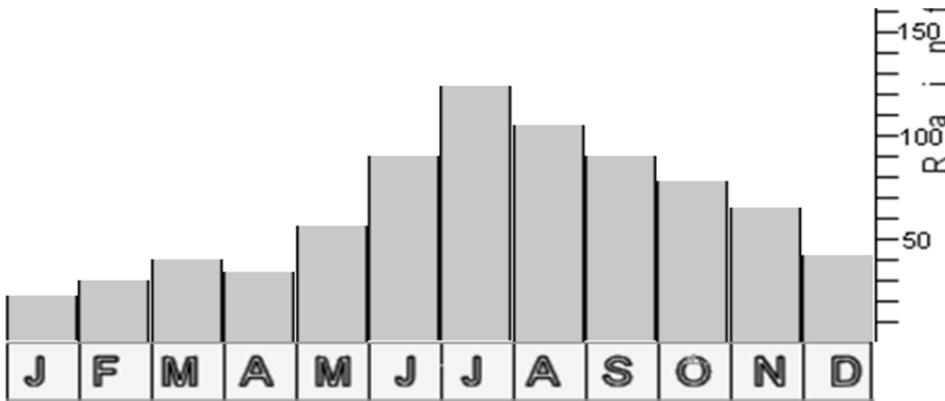
(i) How many students raised more than $\$46.00$?

Stem	Leaf
1	1 4 6 8
2	2 6 8 9 9
3	0 1 3 7
4	5 6 6 9
5	1 2 3 4 5
6	1 2 6 6 7
7	0 4 6 8

(ii) How many raised between \$29.00 and \$51.00?

(iii) How much did the top quarter of students raise?

QUESTION TWO



Waikato Rainfall Graph

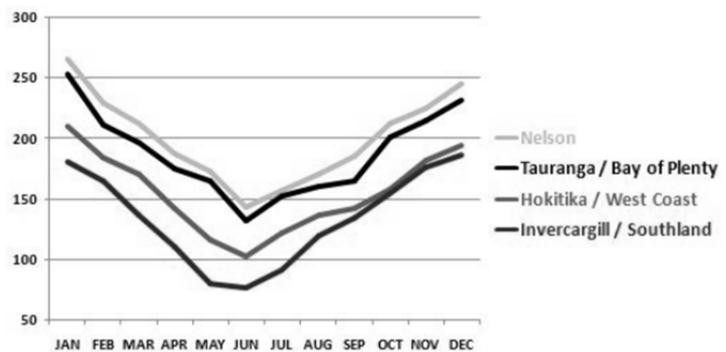
(i) Which was the wettest month of the year?

(ii) Estimate the total rainfall for spring.

QUESTION THREE

(i) In which month does Tauranga have its highest sunshine hours?

Mean monthly sunshine (hours)



New Zealand record: most sunshine hours in one year - Nelson (1931): 2'711 hours.
 New Zealand record: lowest sunshine hours in one year - Invercargill (1983): 1'333 hours.

FAMILY NAME: _____ FIRST NAME: _____

FORM CLASS: _____ TEACHER: _____

Year 9 Mathematics

Final Exam

You should answer ALL parts of ALL questions in this exam paper.

You should show ALL working.

Check that this booklet has the pages in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO YOUR TEACHER AT THE END OF THE ALLOTTED TIME.

Number	Algebra	Geometry	Measurement	Statistics
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>For Assessor's use only</i>	Achievement Criteria	
Achievement	Achievement with Merit	Achievement with Excellence
Apply procedures in solving problems.	Apply procedures involving relational thinking, in solving problems.	Apply procedures involving extended abstract thinking, in solving problems.
Overall Level of Performance		<input type="checkbox"/>

SECTION 1: Number problems in context

You are advised to spend 20 minutes answering the questions in this section.

QUESTION ONE

Amelia buys a box of chocolates. She gives $\frac{1}{3}$ of the box to Tracey and takes $\frac{1}{2}$ of the box to school. What fraction of her chocolates does she leave at home?

QUESTION TWO

The school table tennis team travelled to a competition in Hamilton. The cost for bus tickets and accommodation was \$250. The bus tickets cost \$140. What percentage of the cost was for accommodation?

QUESTION THREE

A "G" category ticket to the Rugby World Cup semi-finals cost \$85.

- (i) That same ticket would have cost 45% less at the quarter-finals. How much would that have been?

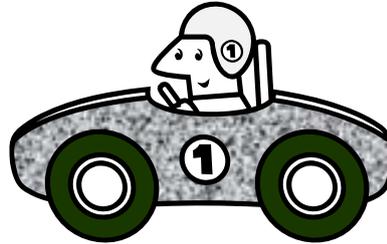
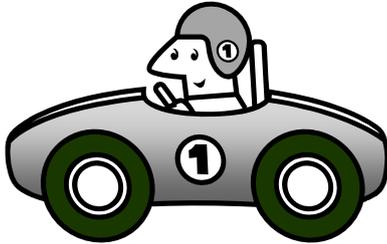
- (ii) But, for the finals, this same ticket is increased by 55%. How much will the ticket cost for the finals?

QUESTION FOUR

Two different car dealers are selling the same model car.

Bono Bayliss is advertising his car as “\$18,000 with 30% discount”.

Gerard Jones advertises his car as “\$15,000 with 15% discount”.



- (i) Which car is cheaper?

- (ii) By how much is it cheaper?

QUESTION FIVE

Saturn orbits the sun at an average distance of 1,429,400,000 km.

Earth orbits the sun at an average distance of 149,597,888 km.

An astronomical unit (AU) is the distance from Earth to the Sun.

Light and radio waves travel at 299,792,458 m/s.

- (i) How far is Saturn from Earth?

- (ii) How many AUs from Saturn to the Sun?

- (iii) How long would it take a particle of light to travel from Earth to Saturn and back? (Give the time in minutes)

QUESTION SIX

Money is exchanged at three different banks..

Jacke changed his NZ\$210 and got A\$175.

Angie changed her NZ\$550 and got A\$440.

Pauli changed his NZ\$165 and got A\$128.70.

- (i) The exchange rate at Jacke's bank was 0.8333. Write down the sum that shows how this could be calculated to give Jacke his US\$175.

- (ii) Who got the best exchange rate? Explain and show your working.

SECTION 2: Apply Algebraic Procedures in Solving Problems

You are advised to spend 30 minutes answering the questions in this section.

QUESTION ONE

- (a) Solve these equations:

(i) $x + 15 = 35$

$x =$

(ii) $x^2 = 6.25$

$x =$

(b) Solve $6x - 20 = 4x + 14$

$x =$

(c) (i) Factorise $8m + 8y$

(ii) Simplify $7a + 5b - 2a + b$

(d) Show that $\sqrt{y^6} = y^3$

QUESTION TWO

(a) Michelle found the following formula for the area of a rectangle:

$$A = bh$$

(i) If $b = 12$ and $h = 20$, find A .

$A =$

- (ii) Michelle now wants to use the same formula to find h in a different situation.

She knows that $A = 270$ and $b = 15$.

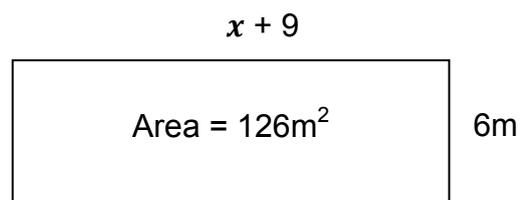
$h =$

- (b) (i) Expand: $4(x+5)$

- (ii) Solve: $4(3-x) = -8$

$x =$

- (c) Bharat has to mow the back lawn. This is what it looks like.



- (i) Write an equation for the perimeter of the lawn.

- (ii) Write an equation for the area of the lawn.

(iii) What is the value of x ?

$x =$

QUESTION THREE

(a) Solve: $3(x+8)=0$

$x =$

(b) Simplify: $2x + 4x^2 - x + 3x^2$

(c) Jacob spent \$60 buying some magazines in a sale. He bought *Rugby News* and *Squash NZ*.

(i) Jacob writes an equation for the amount he spent as: $R + S = 60$

Explain the terms of the equation.

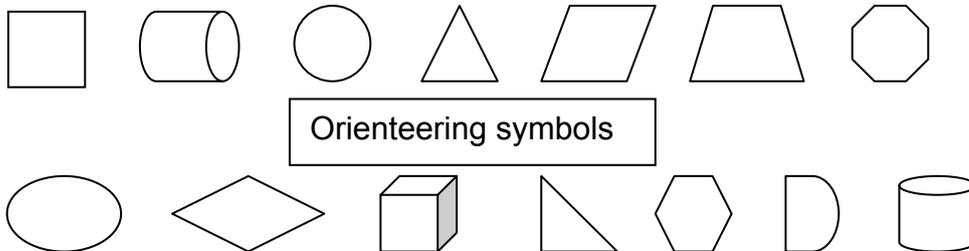
(ii) The *Rugby News* cost \$15 more than the *Squash NZ* magazines.

How much did the *Rugby News* cost?

SECTION 3: Apply geometric reasoning in solving problems

You are advised to spend 30 minutes answering the questions in this section.

QUESTION ONE



ORIENTEERING COURSE

You have to draw a map for orienteers to follow.

Each square on your map grid is counted as 100m.

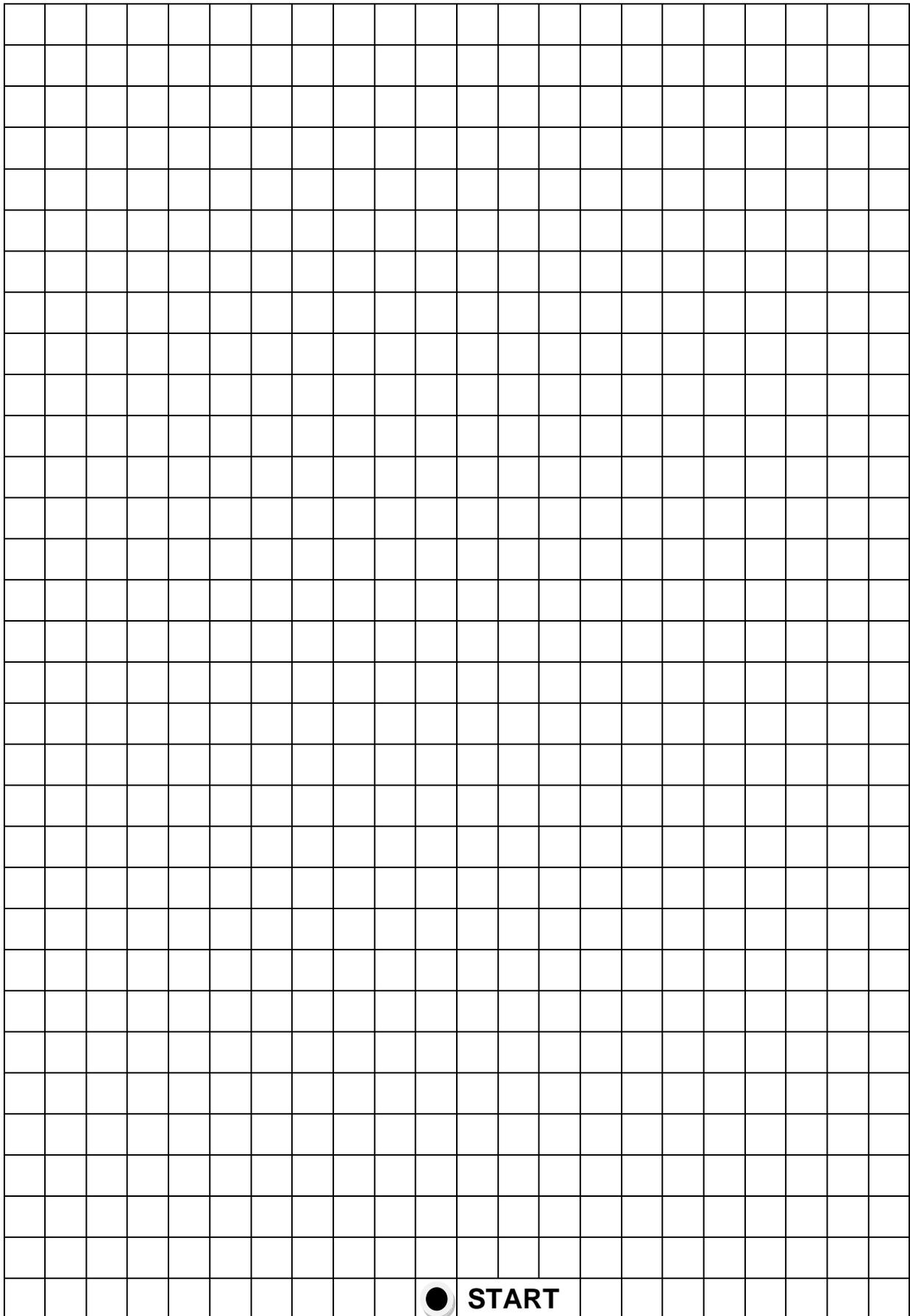
There are 12 “legs”.

At the end of each leg you must draw a symbol – taken from the set above.

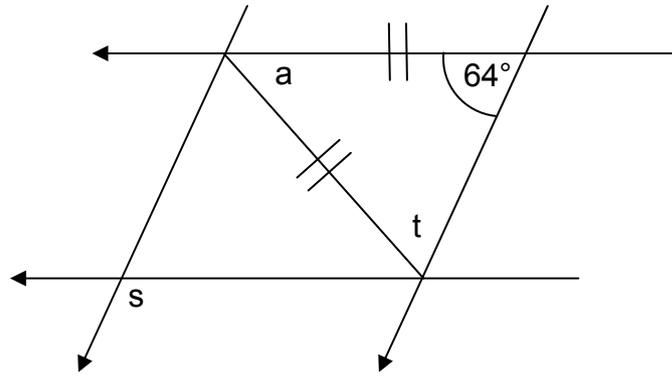
Instructions on how to draw the map:

- 1 From the START move 200m on a bearing of 000° - draw a circle
- 2 Move 600m on a bearing of 090° - draw a square
- 3 Move 500m on a bearing of 000° - draw a cylinder
- 4 Move 400m on a bearing of 270° - draw a triangle
- 5 Move 200m on a bearing of 315° - draw a semi-circle
- 6 Move 300m on a bearing of 045° - draw a right-angled triangle
- 7 Move 400m on a bearing of 090° - draw a vertical cylinder
- 8 Move 400m on a bearing of 315° - draw a octagon
- 9 Move 500m on a bearing of 000° - draw an hexagon
- 10 Move 400m on a bearing of 225° - draw a parallelogram
- 11 Move 600m on a bearing of 180° - draw a ellipse
- 12 Move 300m on a bearing of 270° - draw a horizontal cylinder

ORIENTEERING MAP



QUESTION TWO



(i) $t =$

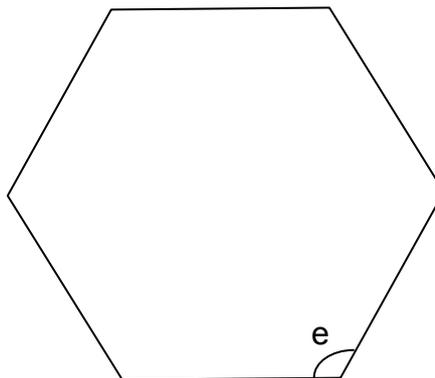
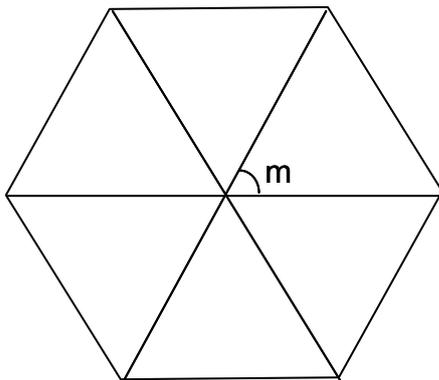
(ii) $a =$

(iii) $s =$

QUESTION THREE

Here are two regular hexagons:

[CLUE: The exterior angles of any polygon add up to 360° .]



(i) Using your knowledge of hexagons, work out the size of angle “e”

(ii) Write an equation to show why “m” equals 60°

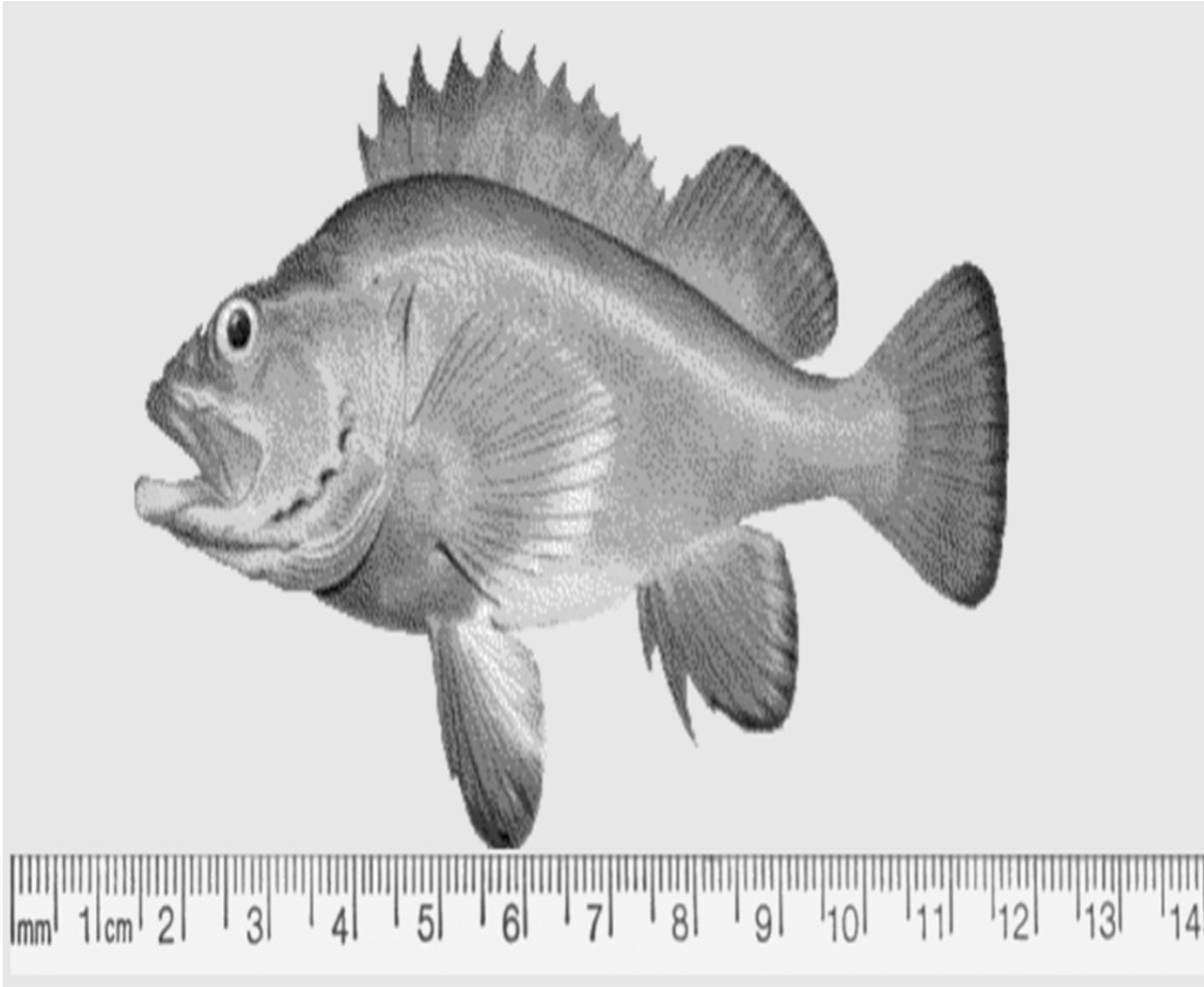
(iii) Each side of a hexagon makes an angle of 60° at the centre. How many sides would a polygon have if the angle at the centre was 30° ?

SECTION 4: Solve problems involving measurement

You are advised to spend 20 minutes answering the questions in this section.

Assessor's
use only

QUESTION ONE



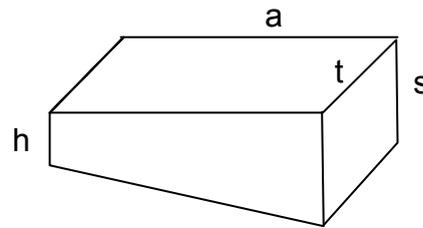
- (i) Estimate the height of the tail of this goldfish at the widest point?

- (ii) The dorsal fin runs along the top of a fish. Estimate the length of the dorsal fin.

- (iii) Rare goldfish are often sold by size. This one costs \$45.00 per 5cm^2 . Estimate how much will it cost you to buy it.

QUESTION TWO

This is a really bad drawing of the Waiiti swimming pool. It is 30m long, 8m wide and 1m at the shallow end. The bottom of the pool slopes down to 3m.



(i) What are the measurements marked h , a , t , s on this drawing?

$h =$ _____ $a =$ _____

$t =$ _____ $s =$ _____

(ii) Calculate the area of the cross-section of the pool.

(iii) Watercare Ltd sells water for $\$1.64/m^3$. How much does the Council have to pay to fill the pool?

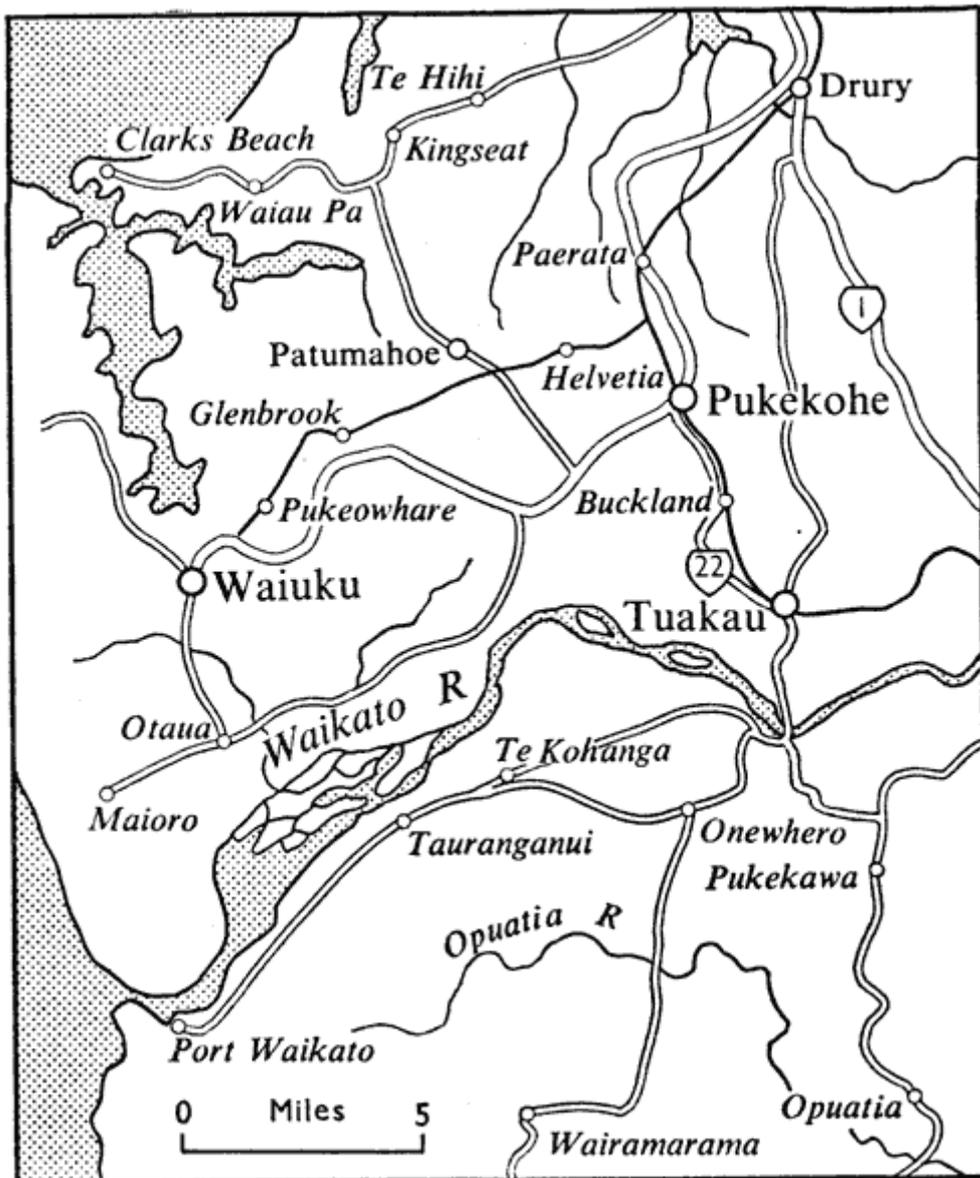
QUESTION THREE

(Refer to the map following these questions.)

(i) In this old map the distances are given in miles rather than in kilometres. What is the flying distance from Waiuku to Clark's Beach in miles?

(ii) Estimate the distance by road in miles from Tuakau to Drury.

- (iii) This map was printed before 1967, when New Zealand moved to decimal currency and the metric system. Which are the largest population centres (towns) at the time this map was printed? How can you tell this?



SECTION 5: Sketch and interpret graphs

You are advised to spend 20 minutes answering the questions in this section.

QUESTION ONE

Mahobe College students have been fundraising for the Canterbury Earthquake Appeal. The Stem and Leaf graph shows the distribution of how much money was collected by the different form classes in the school.

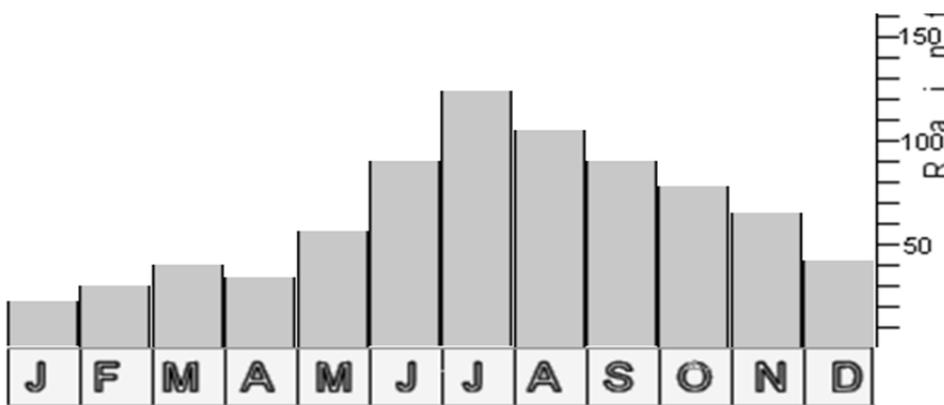
- (i) How many forms raised more than \$30.00?

Stem	Leaf
1	1 4 6 8
2	2 6 8 9 9
3	0 1 3 7
4	5 6 6 9
5	1 2 3 4 5
6	1 2 6 6 7
7	0 4 6 8

- (ii) How many raised between \$20.00 and \$50.00?

- (iii) How much did the least successful quarter of students raise?

QUESTION TWO

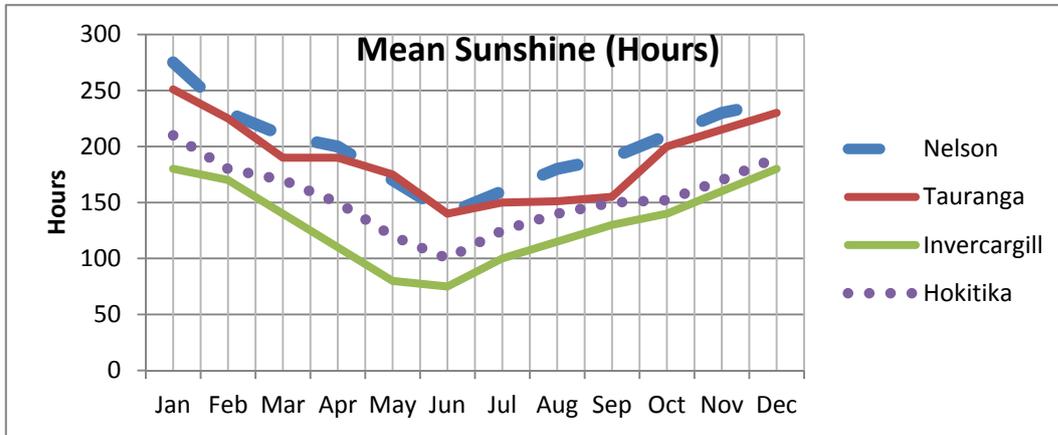


Waikato Rainfall Graph

- (i) Which was the driest month of the year?

(ii) Estimate the total rainfall for summer.

QUESTION THREE



(i) In which month does Hokitika have its lowest sunshine hours?

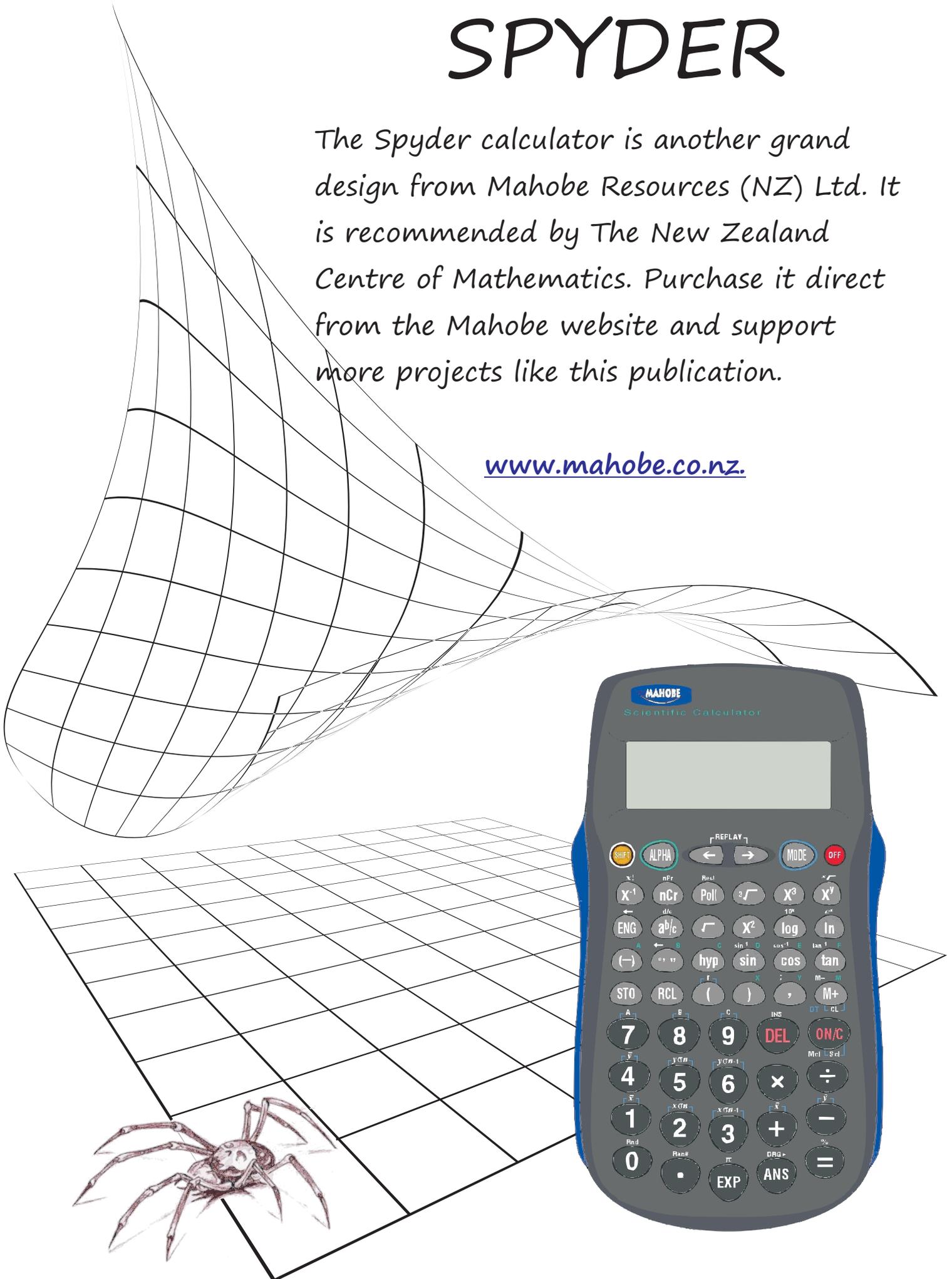
(ii) Would the combined sunshine hours of Tauranga and Hokitika be more or less than the combined sunshine hours for Nelson and Invercargill? What do you think? Show any working.

(iii) This graph is a V-shape. What would the shape be like if it was showing mean temperature rather than sunshine hours?

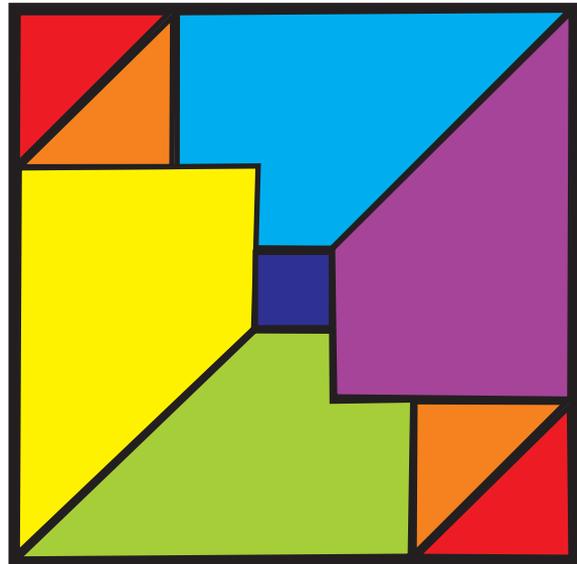
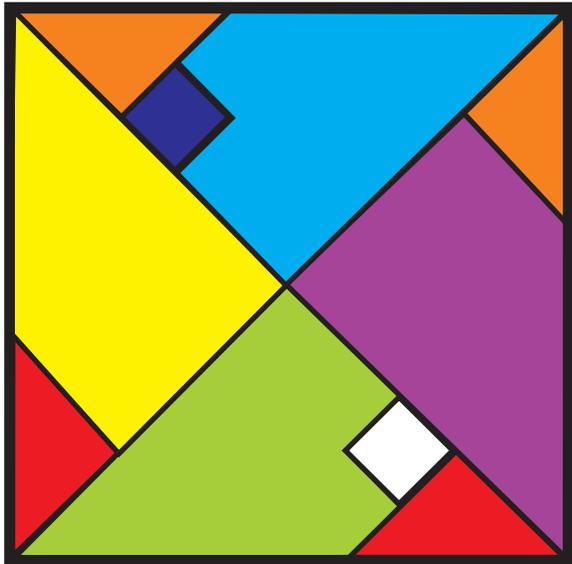
SPYDER

The Spyder calculator is another grand design from Mahobe Resources (NZ) Ltd. It is recommended by The New Zealand Centre of Mathematics. Purchase it direct from the Mahobe website and support more projects like this publication.

www.mahobe.co.nz



Is there a piece missing in your Mathematics?



SPYDER

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www.mahobe.co.nz

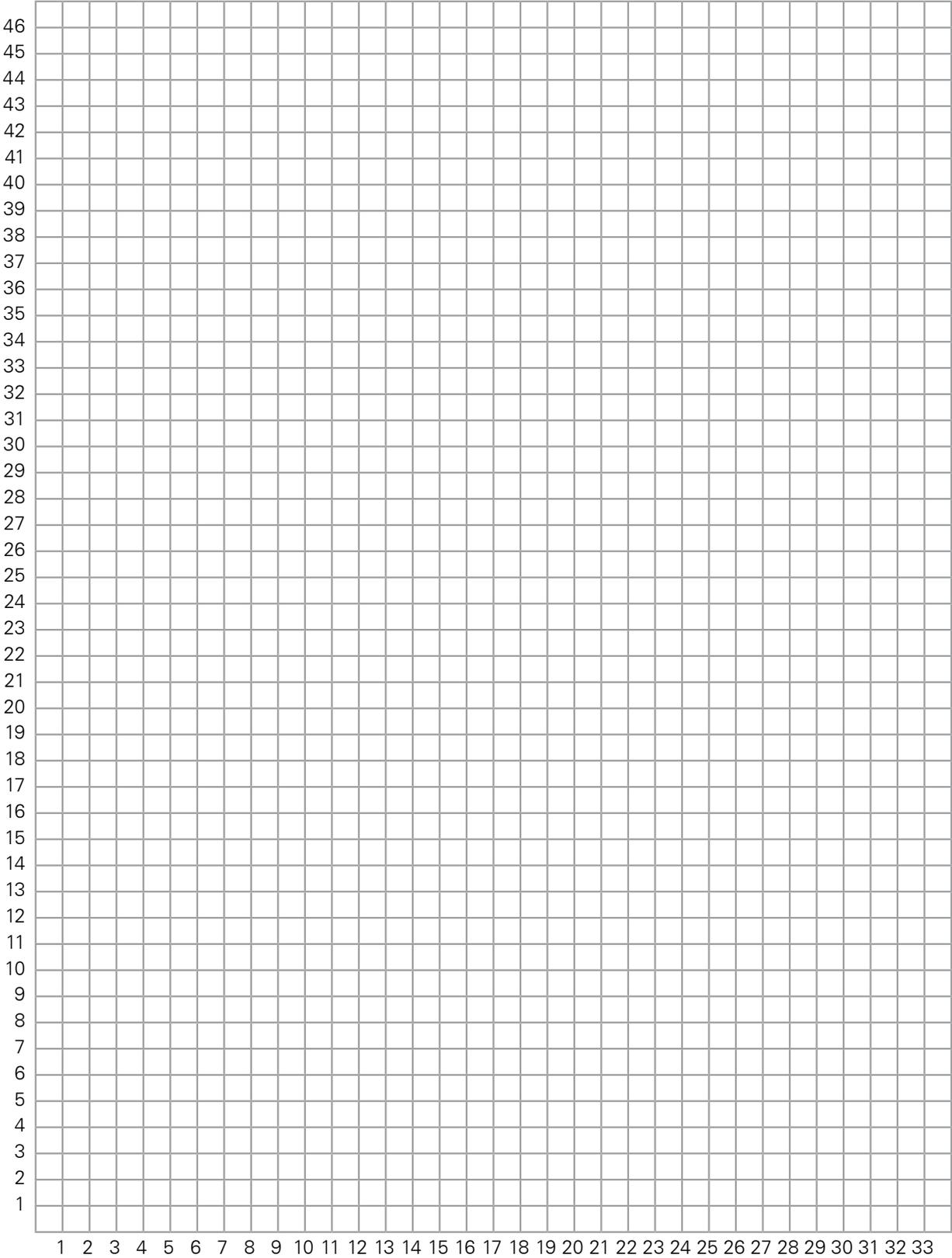
Coordinate drawing

On a piece of graph paper, plot the following points on a 33 by 46 graph. Connect the dots as you go to create the picture.

(x,y)					
START					
(19,4)	(16,14)	(8,20)	(15,21)	(29,28)	(30,12)
(20,6)	(15,17)	(8,23)	(19,24)	(27,28)	(31,9)
(21,7)	(14,17)	(9,21)	(16,21)	(27,24)	(33,9)
(20,7)	(14,15)	(10,21)	(17,21)	(30,20)	(31,8)
(19,8)	(13,16)	(11,23)	(20,23)	(28,22)	(29,12)
(18,9)	(13,15)	(11,21)	(18,20)	(25,22)	(28,13)
(17,11)	(12,16)	(12,21)	(19,20)	(23,20)	(25,13)
(15,13)	(14,18)	(12,23)	(21,22)	(24,19)	(24,11)
(15,9)	(13,19)	(11,24)	(22,25)	(21,16)	(24,8)
(13,10)	(12,19)	(9,23)	(21,28)	(23,15)	(23,7)
(11,10)	(12,18)	(9,25)	(17,36)	(21,15)	(22,7)
(10,9)	(13,18)	(8,27)	(28,46)	(21,14)	(22,4)
(10,10)	(12,17)	(6,27)	(24,41)	(22,13)	(21,5)
(9,9)	(10,18)	(4,26)	(25,39)	(22,12)	(21,3)
(10,11)	(11,17)	(6,28)	(28,36)	(21,10)	(20,4)
(9,10)	(9,17)	(7,30)	(32,34)	(22,10)	(20,3)
(10,12)	(8,15)	(6,32)	(29,35)	(22,9)	(19,4)
(12,11)	(8,17)	(2,36)	(27,35)	(23,9)	STOP
(14,11)	(7,16)	(7,33)	(26,34)	(23,11)	
(14,12)	(6,17)	(11,32)	(27,32)	(24,13)	
(13,13)	(8,19)	(12,27)	(29,29)	(25,14)	
(14,14)	(7,21)	(14,23)	(32,26)	(28,14)	

Coordinate drawing

Name: _____



Coordinate drawing

On a piece of graph paper, plot the following points on a 33 by 46 graph. Connect the dots as you go to create the picture.

(x,y)					
START					
(5,2)	(9,23)	(15,32)	(29,18)	(26,6)	(14,3)
(6,3)	(9,22)	(13,31)	(28,16)	(28,4)	(12,3)
(6,4)	(8,21)	(15,31)	(28,15)	(27,4)	(13,4)
(8,5)	(7,22)	(17,30)	(27,14)	(27,3)	(16,8)
(9,7)	(7,25)	(14,30)	(27,12)	(26,4)	(16,11)
(11,12)	(6,26)	(16,29)	(29,11)	(26,3)	(15,14)
(11,14)	(7,28)	(15,29)	(30,11)	(24,3)	(14,12)
(9,14)	(6,28)	(17,28)	(31,12)	(25,4)	(12,10)
(6,13)	(5,27)	(18,27)	(30,10)	(25,7)	(11,8)
(6,11)	(5,29)	(17,27)	(28,10)	(24,9)	(9,5)
(7,11)	(4,29)	(18,26)	(26,11)	(24,10)	(10,4)
(8,10)	(6,30)	(18,25)	(25,13)	(23,11)	(9,4)
(7,10)	(2,34)	(19,25)	(25,15)	(21,14)	(9,2)
(8,9)	(7,31)	(18,24)	(26,17)	(20,14)	(8,3)
(6,9)	(8,32)	(19,23)	(26,19)	(18,12)	(7,2)
(5,11)	(9,32)	(19,22)	(25,20)	(18,9)	(5,2)
(5,14)	(10,33)	(21,22)	(23,20)	(16,5)	STOP
(8,16)	(10,32)	(23,21)	(24,18)	(17,3)	
(8,17)	(11,32)	(25,22)	(24,14)	(16,4)	
(9,18)	(13,33)	(26,22)	(25,11)	(16,3)	
(10,24)	(12,32)	(28,20)	(26,9)	(15,4)	

Coordinate drawing

Name: _____

