Home Learning 1.1 Date Due:.....

1 Write down the first four terms of each sequence whose nth term is given below.

a $3n + 1$ **b** $4n - 2$ **c** $2n + 7$ **d** $6n - 5$ **e** $2n - 9$

2 Find the nth term of each of the following sequences.

a 5, 7, 9, 11, ... **b** 2, 5, 8, 11, ... **c** 11, 16, 21, 26, ... **d** 5, 13, 21, 29, ...

3 Find the nth term of each of the following sequences of fractions.

a $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \ldots$ **b** $\frac{1}{3}, \frac{2}{5}, \frac{3}{7}, \frac{4}{9}, \ldots$

4 Find the nth term of each of the following sequences.

a 3.5, 5, 6.5, 8, 9.5, ... **b** 5.1, 7.2, 9.3, 11.4, ... **c** 3.6, 6.1, 8.6, 11.1, ...

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Home Learning 1.2 Date Due:.....

Look at the following diagrams.

Diagram	1	2	3	4	5	6
Crosses	1	5	13			

a Before drawing a diagram, can you predict, from the table, the number of crosses in Diagram 4?

b Draw Diagram 4, and count the number of crosses there are. Were you right?

c Now predict the number of crosses for Diagrams 5 and 6.

d Check your results for part **c** by Drawing diagrams 5 and 6.

e Write down the term-to-term rule for the sequence of crosses. (**Hint:** $4 = 2^2$, $8 = 2^3$)

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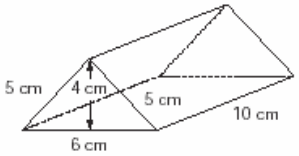
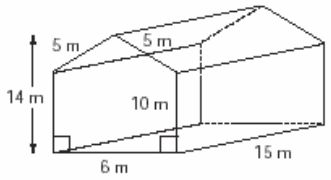
Home Learning 6.4 Date Due:.....

1 Calculate **i** the total surface area and **ii** the volume of each of the following prisms.

a



b

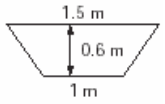


2 A child's toy brick has a cross-section of area 850 mm^2 and is 8 mm high.

a Calculate the volume of the brick, giving your answer in cubic millimetres.

b Write down the volume of the brick in cubic centimetres.

3 The diagram shows the measurements of the cross-section of a water trough. The length of the trough is 3 m.



a Calculate the volume of the trough.

b How many litres of water can the trough hold when it is full?

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Home Learning 1.3 Date Due:.....

1 Write down the inverse of each of the following functions.

a $x \to 3x$ **b** $x \to x + 8$ **c** $x \to 6 + x$ **d** $x \to \frac{x}{2}$ **e** $x \to 2x + 1$ **f** $x \to 4x + 3$ **g** $x \to 3x - 5$

2 Write down two different types of inverse function and show that they are self inverse functions.

3 Write down the inverse of each of the following functions.

a $x \to 3(x + 5)$ **b** $x \to \frac{1}{2}(x + 5)$ **c** $x \to \frac{(6 + x)}{4}$

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Home Learning 1.4 Date Due:.....

1 Sketch graphs to show how the depth of water varies with time when water drips steadily into the following containers.

a b c

2 Sketch distance–time graphs to illustrate each of the following situations.

a A car accelerating away from traffic lights.

b A train slowing down to a standstill in a railway station.

c A car travelling at a steady speed and then having to accelerate to overtake another vehicle before slowing down to travel at the same steady speed again.

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Home Learning 6.4 Date Due:.....

1 Express each of the following in mm^2.

a $3\ cm^2$ b $8\ cm^2$ c $4.5\ cm^2$ d $0.8\ cm^2$

2 Express each of the following in m^2.

a $40\,000\ cm^2$ b $70\,000\ cm^2$ c $32\,000\ cm^2$ d $5000\ cm^2$

3 Express each of the following in cm^3.

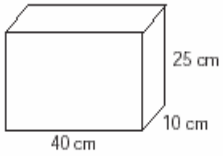
a $2\ m^3$ b $9\ m^3$ c $3.7\ m^3$ d $0.3\ m^3$

4 Express each of the following in litres.

a $8000\ cm^3$ b $12\,000\ cm^3$ c $23\,500\ cm^3$ d $250\ cm^3$

5 A rectangular park is 620 m long and 340 m wide. Find the area of the park in hectares.

6 Calculate the volume of the box on the right. Give your answer in litres.



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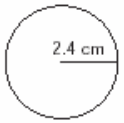
Home Learning 6.3 Date Due:.....

Take $\pi = 3.14$ or use the π key on your calculator.

1 Calculate the area of each of the following circles. Give your answers to one decimal place.

a



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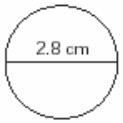
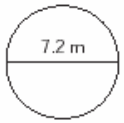


c



2 Find the area of a circle with a radius of 30 m. Give your answer in terms of π.

3 Calculate the area of a circular table with a diameter of 2.1 m. Give your answer to two decimal places.

4 Calculate the approximate area of Kate's semicircular brooch shown on the right.

Give your answer to one decimal place.

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Home Learning 2.1 Date Due:.....

Convert each of the following pairs of fractions to equivalent fractions with a common denominator. Then work out each answer, cancelling down and/or writing as a mixed number if appropriate.

a $2\frac{2}{5} + 2\frac{1}{4}$ **b** $2\frac{2}{3} + 1\frac{1}{8}$ **c** $2\frac{2}{3} + 1\frac{5}{7}$ **d** $2\frac{1}{5} + 3\frac{2}{8}$

e $2\frac{2}{5} - 1\frac{1}{4}$ **f** $2\frac{1}{3} - 1\frac{5}{8}$ **g** $2\frac{5}{8} - 1\frac{5}{12}$ **h** $3\frac{5}{12} - 1\frac{3}{4}$

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Home Learning 2.2 Date Due:.....

1 Work out each of the following. Cancel before multiplying when possible.

a $\frac{1}{6} \times \frac{3}{8}$ **b** $\frac{2}{3} \times \frac{3}{4}$ **c** $\frac{2}{9} \times \frac{3}{16}$ **d** $4\frac{1}{3} \times 1\frac{3}{7}$ **e** $2\frac{3}{8} \times 1\frac{3}{5}$

2 Work out each of the following. Cancel at the multiplication stage when possible.

a $\frac{1}{4} \div \frac{1}{3}$ **b** $\frac{3}{15} \div \frac{9}{14}$ **c** $\frac{1}{6} \div \frac{1}{3}$ **d** $2\frac{5}{8} \div \frac{7}{16}$ **e** $2\frac{3}{5} \div \frac{3}{10}$

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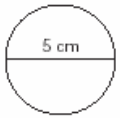
Home Learning 6.2 Date Due:.....

Take $\pi = 3.14$ or use the π key on your calculator.

1 Calculate the circumference of each of the following circles. Give your answers to one decimal place.

a



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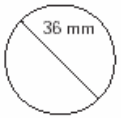

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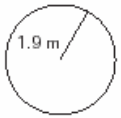

2 The Earth has a radius of 6400 km. Calculate the distance round the equator, giving your answer to the nearest 100 kilometres.

3 A cylindrical can has a diameter of 12 cm.

What is the length of a label going round the can, if its ends overlap by 1 cm? Give your answer to one decimal place.

4 The diameter of each wheel on Sam's bike is 75 cm.

a Calculate the circumference of each wheel, giving your answer to the nearest centimetre.

b How many times does each wheel turn when Sam rides his bike for a distance of 2 km? Give your answer to the nearest 10 turns.

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Home Learning 2.3 Date Due:.....

1 How much would you have in the bank if you invest as follows?

a £450 at 3% interest per annum for 4 years

b £6000 at 4.5% interest per annum for 7 years

2 Stocks and shares can decrease in value as well as increase. How much would your stocks and shares be worth if you had invested as follows?

a £1000, which lost 14% each year for 3 years

b £750, which lost 5.2% each year for 5 years

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Home Learning 2.4 Date Due:.....

1 A packet of biscuits claims to be 24% bigger! It now contains 26 biscuits. How many did it have before the increase?

2 After a 10% price decrease, a hi-fi system now costs £288. How much was it before the decrease?

3 This table shows the cost of some items after 17½% VAT has been added. Work out the cost of each item before VAT.

Item	Cost inc VAT	Item	Cost inc VAT
Radio	£112.80	Cooker	£329
Table	£131.60	Bed	£376

4 A pair of designer jeans is on sale at £96, which is 60% of its original price. What was the original price?

5 A pair of boots, originally priced at £60, were reduced to £36 in a sale. What was the percentage reduction in the price of the boots?

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Home Learning 5.5 Date Due:.....

1 Here are two sets of test results for 60 students.

Percentage mark	Number of students	
	French	Art
0–20	5	12
21–40	8	11
41–60	21	14
61–80	16	12
81–100	10	11

a Draw a pie chart for each subject.

b Compare the results for French and art.

2 A survey was carried out about the favourite cheese of men and women. Here are the results.

	Red	White
Men	65%	35%
Women	30%	70%

a Draw a percentage bar chart to represent these data.

b Compare the results for men and women.

Home Learning 2.5 Date Due:.....

1 Cancel each of the following ratios to its simplest form.

a 9 : 21 **b** 10 : 45 **c** 18 : 24 **d** 12 : 15

2 Write each of the following ratios in the form 1 : n.

a 10 : 9 **b** 20 : 7 **c** 8 : 12 **d** 30 : 50

3 Write each of the following ratios in the form n : 1

a 12 : 25 **b** 26 : 50 **c** 20 : 4 **d** 15 : 8

4 **a** Divide £480 in the ratio 3 : 5 **b** Divide £240 in the ratio 1 : 1.5

Mark: .....

Home Learning 2.6 Date Due:.....

1 Say which of these statements is true. If it is not true, give a counter-example.

a The square of a number between 0 and 1 is also between 0 and 1.

b The square of a number between 0 and −1 is also between 0 and −1.

c Dividing any number by a number between 0 and 1 always gives a bigger answer.

d Dividing any positive number by a number between 0 and 1 always gives a bigger answer.

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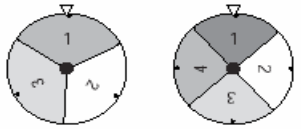
Home Learning 5.4 Date Due:.....

1 Two fair spinners are spun and the scores are added together to get a total score. This is recorded in the two-way table, shown below.



	Second spinner			
	+	1	2	3
First spinner	1	2	3	
	2	3		
	3			
	4			

a Compete the table of total scores.
b List all the total scores which are prime numbers.
c State the most likely total scores.
d Write down the probability of getting a total score of 7. Give your answer as a fraction in its simplest form.
e Write down the probability of getting a total score of 5. Give your answer as a fraction in its simplest form.

2 A year group recorded the days of the week on which they were born. Here are the results.

Day	Boys	Girls
Monday	23	19
Tuesday	19	25
Wednesday	27	28
Thursday	31	26
Friday	35	41
Saturday	14	17
Sunday	12	11
Total	161	167

a Write a comment on the births of boys and girls.
b Write a comment about the number of births on different days of the week.

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Home Learning 2.7 Date Due:.....

Use BODMAS to evaluate each of these.

a $(3 + 4)^2 \times (6 - 3)$ **b** $(5^2 - 4) \div (2 + 1)^2$ **c** $(4 + 4^2) \div (2 \div 2)^3$

d $48 \div (9 - 1) - 8 + 2(18 \div 6)^3$ **e** $(5 + 2) \times 3^2 - 5(2^3 - 4)$

f $[7 + (4 - 1)^2] \div 3(4 - 2)^2$ **g** $(5 - 2)^3 \div [(4 - 1) + (3^2 - 3)]$

h $\dfrac{5 \times 4^2}{10 \times 2}$ **i** $\dfrac{(5 \times 4)^2}{10 \times 2}$

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Home Learning 2.8 Date Due:.....

1 By rounding each value to one significant figure, estimate the answer to each of the following.

a 0.83×793 **b** $618 \div 32$ **c** $812 \div 0.38$

d 0.78×0.049 **e** $(38 \times 3.2) - 48.7$ **f** $(2.7 + 6.3) \times (5.2 - 1.7)$

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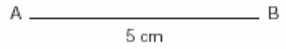
Home Learning 4.6 Date Due:.....

1 Using a ruler and compasses, construct the locus which is equidistant from the points A and B.

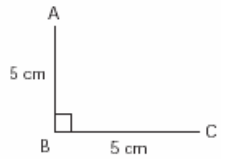


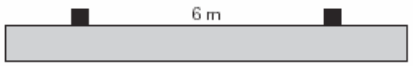
2 Using a ruler and compasses, construct the locus which is equidistant from the perpendicular lines AB and BC.

3 Draw a diagram to show the locus of a set of points which are 4 cm or less from a fixed point X.

4 Two alarm sensors, 6 m apart, are fitted to the side of a house, as shown below. The sensors can detect movement to a maximum distance of 5 m.

Draw a scale drawing to show the region that can be detected by both sensors. Use a scale of 1 cm to 1 m.





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Home Learning 3.1 Date Due:.....

1 Solve the following equations.

a $5(x + 7) = 45$ b $3(x - 5) = 12$ c $6(y + 3) = 48$ d $5(m - 7) = 55$

2 Solve the following equations.

a $6(x - 5) = 4(x + 2)$ b $4(x - 1) = 2(x + 3)$ c $6(x + 3) = 4(x + 5)$

3 Solve the following equations.

a $5(m - 2) - 4(m + 3) = 0$ b $5(k + 4) - 3(k - 6) = 0$

c $4(y + 7) - 3(y + 5) = 0$ d $3(2x - 4) - 2(4x + 5) = 0$

Mark: .....

Home Learning 3.2 Date Due:.....

1 I think of a number, add 5, divide by 3 then add 11. The final answer is 17. What was the number I was thinking of?

2 I double my son's age, divide by 3, then add 2. I end up with the age of my daughter who is 20. How old is my son?

3 The length of a rectangle is three times its width. Its perimeter is 56 cm. What is the area of the rectangle?

4 Wesley and Beverly had 223 DVDs between them. For Beverley's birthday, Wesley bought her a box set of 5 DVDs, which meant that she now has half as many as Wesley. How many DVDs does Wesley have?

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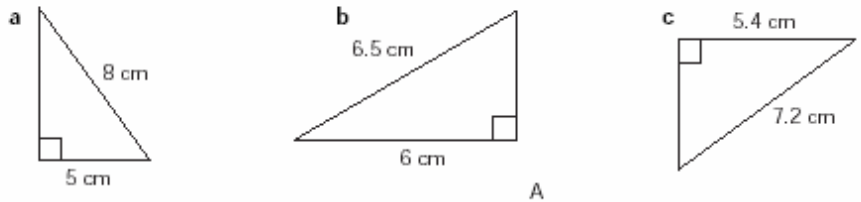
Home Learning 4.5 Date Due:.....

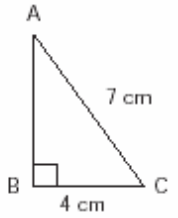
1 Construct each of the following right-angled triangles.



2 a Construct the right-angled triangle ABC.

b Measure the length of the line AB.

c Measure the size of angles A and C.



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Home Learning 3.3 Date Due:.....

1 Solve the following equations.

a $\frac{x}{7} = 4$ **b** $\frac{t}{6} = 2$ **c** $\frac{m}{9} = 5$ **d** $\frac{x}{3} = 8$ **e** $\frac{w}{7} = 8$

2 Solve the following equations.

a $\frac{3x}{5} = 12$ **b** $\frac{3t}{5} = 6$ **c** $\frac{6m}{8} = 18$ **d** $\frac{2x}{5} = 8$ **e** $\frac{2w}{7} = 6$

3 Solve the following equations.

a $\frac{x+1}{3} = 5$ **b** $\frac{x+5}{4} = 8$ **c** $\frac{2x+4}{5} = 6$ **d** $\frac{3x+1}{8} = 2$

4 Solve the following equations.

a $\frac{x-1}{3} = \frac{x+1}{4}$ **b** $\frac{2x+3}{3} = \frac{x-2}{2}$ **c** $\frac{3x-2}{5} = \frac{x+4}{2}$

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Home Learning 3.4 Date Due:.....

1 Solve these equations. Each has two solutions.

a $x^2 + 7 = 32$ **b** $x^2 + 18 = 34$ **c** $m^2 + 34 = 83$

2 Solve these equations. Each has two solutions.

a $(x + 6)^2 = 121$ **b** $(x - 5)^2 = 16$ **c** $(m - 1)^2 = 49$

3 Solve these equations. Each has two solutions.

a $6 = \frac{216}{x^2}$ **b** $5 = \frac{245}{x^2}$ **c** $8 = \frac{648}{x^2}$

4 I square a number, add 48 to it and get 112. What are the two possible numbers I could have squared?

5 I think of a number, subtract 7, square it and get the answer 289. What are the two possible numbers I could be thinking of?

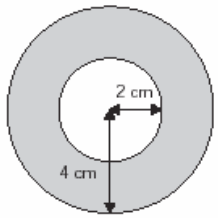
Home Learning 4.3 Date Due:.....

1 Draw each of the following circles.

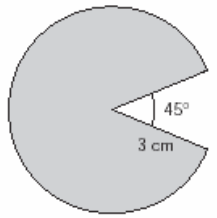
a Radius = 2 cm **b** Radius = 3.5 cm **c** Diameter = 5 cm **d** Diameter = 6.4 cm

2 Draw each of the following diagrams accurately.

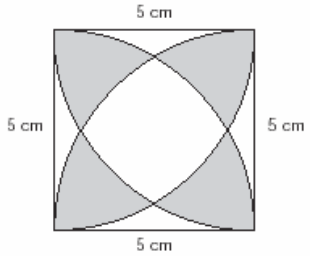
a



b



c



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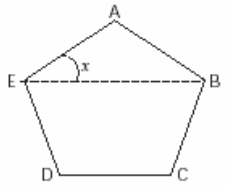
Home Learning 4.2 Date Due:.....

1 Calculate the size of **i** each exterior angle and **ii** each interior angle for each of the following regular polygons.

a Pentagon **b** Hexagon **c** Octagon

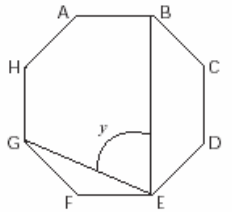
2 ABCDE is a regular pentagon. Calculate the size of the angle marked x on the diagram.

Explain, with reasons, how you obtained your answer.



3 ABCDEFGH is a regular octagon. Calculate the size of the angle marked y on the diagram.

Explain, with reasons, how you obtained your answer.



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Home Learning 3.5 Date Due:.....

Find, to one decimal place, the solution to each of the following equations. Use a trial and improvement method in each case.

a $x^2 + x = 65$ **b** $x^2 - x = 99$ **c** $x^3 + x = 100$ **d** $x^3 - x = 50$

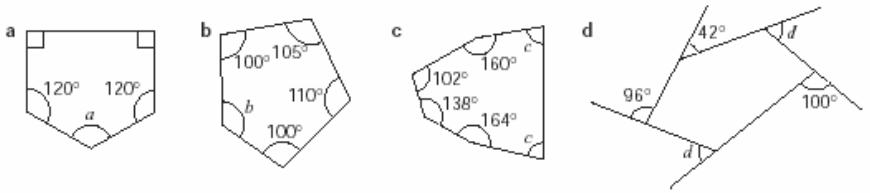
Mark: .....

Home Learning 4.1 Date Due:.....

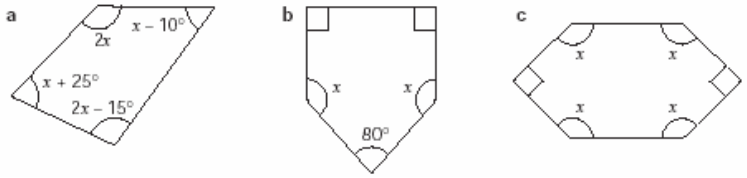
1 Find the sum of the interior angles for each of the following polygons.

a Pentagon **b** Hexagon **c** Octagon

2 Calculate the unknown angle in each of the following polygons.



3 Calculate the value of x in each of the following polygons.



Mark: .....