Mathematics Foundation Mock Revision Guide

Name: _____

Form: _____

MathsWatch

Username: _____

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How to use this guide

This guide contains some of the topics that may appear in your Mock examination. Each topic has the MathsWatch clip to go with it

For each topic:

- Watch the clip and make notes
- Look at the things to remember
- Attempt the exam questions
- Check answers on the solutions attached to Show My Homework

Types of Numbers

Things to remember:
- A factor is a whole number that divides exactly into another number.
- A multiple is a number that may be divided by another a certain number of times without a remainder.
- A prime number only has 2 factors – 1 and itself.
- A power tells us how many times the base number has been multiplied by itself
- A root is the opposite of a power.
- A square number is the result of multiplying an integer (whole number) by itself.

Questions:

1. (a) Write down the square of 8

....
(1)

   (b) Write down the value of 10^3

....
(1)

   (c) Estimate the value of $\sqrt{20}$

....
(1)
(Total for Question is 3 marks)

2. Here is a list of eight numbers: 4   5   14   25   29   30   33   39   40
   From the list, write down
   (i) a factor of 20

....

   (ii) a multiple of 10

....

   (iii) the prime number that is greater than 15

....
(Total for Question is 3 marks)

3. (a) Write down the value of 7^2

....
(1)

(b) Write down the value of $\sqrt{25}$

....
(1)

(c) Write down the value of 2^3

....
(1)
(Total for Question is 3 marks)

4. (a) Write down the value of $\sqrt{81}$

....
(1)

(b) Work out the value of $5^2 + 2^3$

....
(2)
(Total for Question is 3 marks)

5. Here is a list of numbers:
2   3   10   12   15   16   24
From the list write down
(i) an odd number

....
(1)

(b) a multiple of 6

....
(1)

(c) a factor of 18

....
(1)
(Total for Question is 3 marks)

6. Here is a list of numbers.
2   3   5   8   10   16   21   24
From the numbers in the list,

(a) write down an odd number

....
(1)

(b) write down the square number

....
(1)

(c) write down the number which is a multiple of 6

....
(1)
(Total for Question is 3 marks)

Place Value

Things to remember:
Label columns as below

Thousands	Hundreds	Tens	Units	•	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$

Questions:

3. Write down the value of the 3 in 16.35

    ....

    (Total for question is 1 mark)

4. (a) Work out 90 ÷ 10

    ....

    (1)

    (b) Write these numbers in order of size. Start with the smallest number.
    2.8   4.71   0.6   13.4

    ....

    (1)

    (c) Write 7/10 as a decimal.

    ....

    (1)
    (Total for Question is 3 marks)

5. (a) Write these numbers in order of size. Start with the smallest number.
    0.354   0.4   0.35   0.345

    ....

    (1)

    (1)

    (b) Write these numbers in order of size. Start with the smallest number.
    3.7   5.62   0.7   14.3

    ....

    (1)

    (c) Write $\frac{9}{10}$ as a decimal.
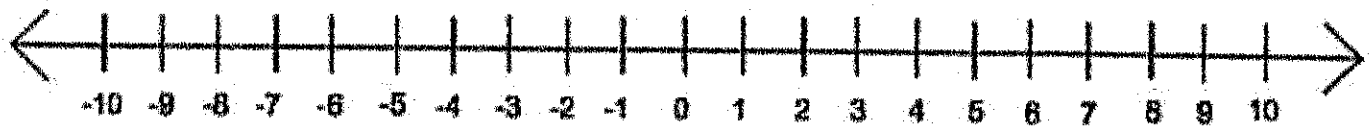
    ....

    (1)
    (Total for question = 4 marks)

Directed Numbers

Things to remember:
- Use a number line – if you're adding you need to move in a positive direction (right), if you're subtracting you need to move in a negative direction (left).

Questions:

1. Sally wrote down the temperature at different times on 1st January 2003.

Time	Temperature
midnight	– 6 °C
4 am	–10 °C
8 am	– 4 °C
noon	7 °C
3 pm	6 °C
7 pm	–2 °C

(a) Write down
   (i) the **highest** temperature,

   (ii) the **lowest** temperature.

   ....°C

   ....°C
   (2)

(b) Work out the difference in the temperature between
   (i) 4 am and 8 am,

   (ii) 3 pm and 7 pm.

   ....°C

   ....°C
   (2)

At 11 pm that day the temperature had fallen by 5 °C from its value at 7 pm.
(c) Work out the temperature at 11 pm.

   ....°C
   (1)
   (Total 5 marks)

2.

   7°C   –2°C   10°C   –5°C   3°C

....

   (Total for question = 1 mark)

Coordinates

Things to remember:
Along the corridor, up the stairs → (x,y)

Questions:

1. (a)   Write down the coordinates of the point *P*.

(.........., ...)

(1)

(b)   (i)   On the grid, plot the point (0, 3). Label the point *Q*.

(ii)   On the grid, plot the point (−2, −3). Label the point *R*.
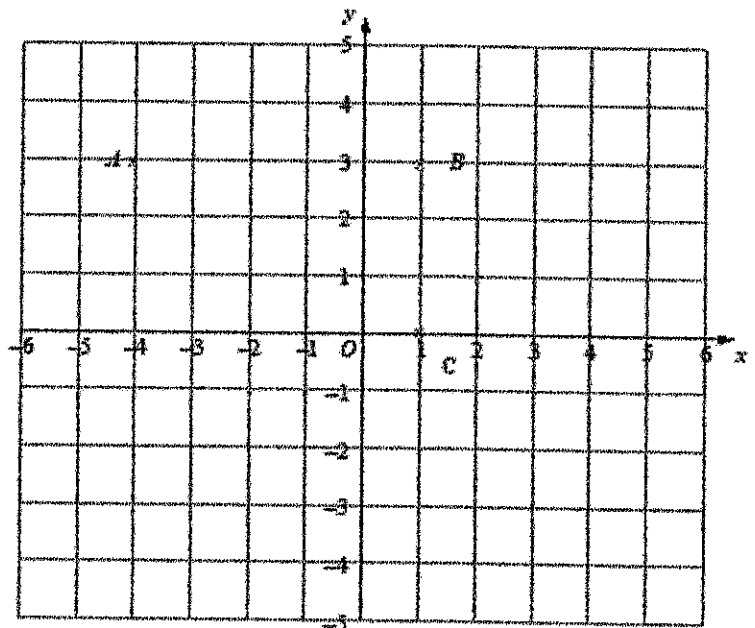
(2)

(Total 3 marks)
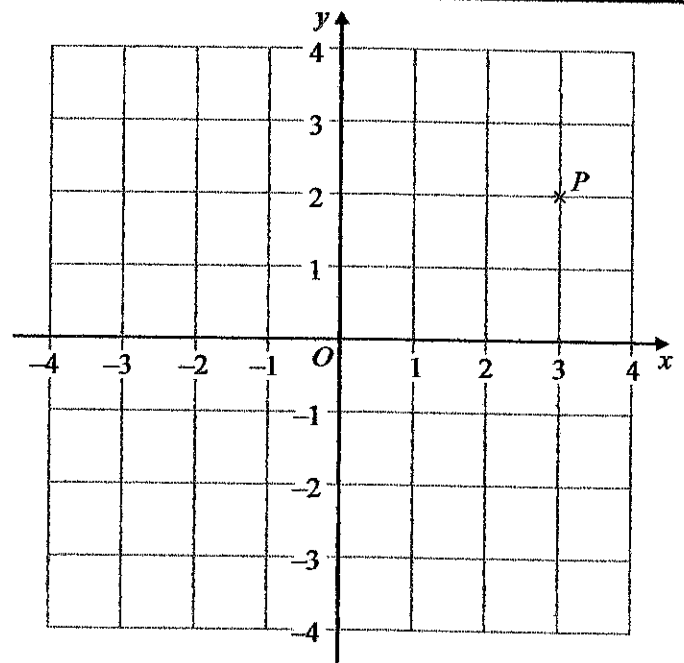
4.   (a)   Write down the coordinates of the point

(i)   *A*,

(.........., ...)

(ii)   *C*.

(.........., ...)

(2)

(b)   (i)   On the grid, mark the point *D* so that *ABCD* is a rectangle.

(ii)   Write down the coordinates of *D*.

(.........., ...)

(2)

(Total 4 marks)

5.   (a)   Write down the coordinates of the point *A*.

(.........., ...)

(1)

(b)   Write down the coordinates of the point *B*.

(.........., ...)

(1)

(c)   On the grid, mark with a cross (×) the point (−3, −1). Label this point *C*.

(1)

(Total for question = 3 marks)
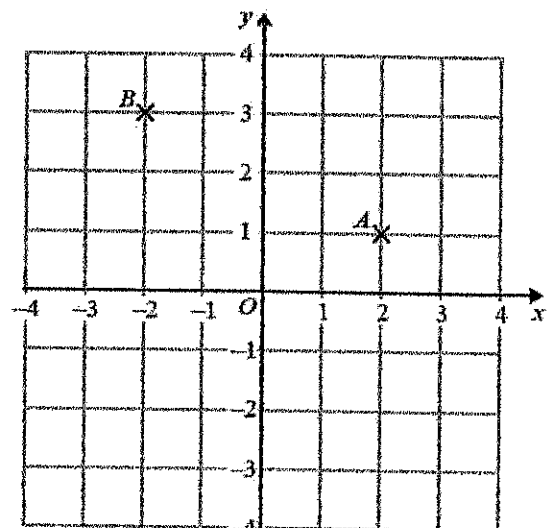
Patterns and Sequences

Things to remember:
- If there is a pattern, look carefully at how many sticks blocks are being added on each time.
- Work out the rule (for example: add 4 or multiply by 2) to help you work out the next term.

Questions:

1. Here are the first four terms of a number sequence.

    6   10   14   18

    (a)   Write down the next term in this sequence.

    ....

    (1)

    (b)   Find the 10ᵗʰ term in this sequence.

    ....

    (1)

    (c)   The number 101 is **not** a term in this sequence. Explain why.

    ....

    ....

    (1)

    (Total for Question is 3 marks)

2. Here are the first four terms of a number sequence.

    3   7   11   15

    (a)   Write down the next term of this sequence.

    ....

    (1)

    The 50ᵗʰ term of this number sequence is 199
    (b)   Write down the 51ˢᵗ term of this sequence.

    ....

3. Here are the first 6 terms of a number sequence.

    5   9   13   17   21   25

    (a)   Write down the next term of the sequence.

    ....

    (1)

    (b)   (i)   Work out the eleventh term of the sequence.

    ....

    (ii)   Explain how you found your answer.

    ....

    ....

    (2)

    (Total for Question is 3 marks)

Collecting Like Terms (Simplifying)

Things to remember:
- 2a means a + a or 2 lots of a
- a^2 means a x a
- The sign (+ or -) belongs to the term following it. You may find it easier to identify like terms using two different highlighters.

Questions:

1. (a)   Simplify $a + a + a + a$

....
(1)

   (b)   Simplify $3 \times c \times d$

....
(1)

   (c)   Simplify $3ef + 5ef - ef$

....
(1)
(Total for Question is 3 marks)

2. (a)   Simplify $b + b + b + b$

....
(1)

   (b)   Simplify $8n - 3n$

....
(1)

   (c)   Simplify $3 \times c \times d$

....
(1)

   (d)   Simplify $3x + 7y + 2x - y$

....
(2)
(Total for Question is 5 marks)

3.   Simplify $3x + 5y + x + 4y$

....
(Total for Question is 2 marks)

4. (a) Simplify $a \times c \times 3$

....
(1)

(b) Simplify $p \times p \times p$

....
(1)

(c) Simplify $5x - 4y + 3x - 3y$

....
(2)
(Total for Question is 4 marks)

5. (a) Simplify $5a - 2a$

....
(1)

(b) Simplify $3 \times 4y$

....
(1)

(c) Simplify $3e + 4f + 2e - f$

....
(2)
(Total for Question is 4 marks)

6. (a) Simplify $m + m + m$

....
(1)

(b) Simplify $9e - 2e$

....
(1)
(Total for Question is 2 marks)

Solving Linear Equations

Things to remember:
- "Solve" means to find the value of the variable (what number the letter represents).
- The inverse of + is − and the inverse of x is ÷
- Work one step at a time, keeping you = signs in line on each new row of working.

Questions:

1. A two step function machine is shown.

INPUT [x 3 > + 4 > OUTPUT
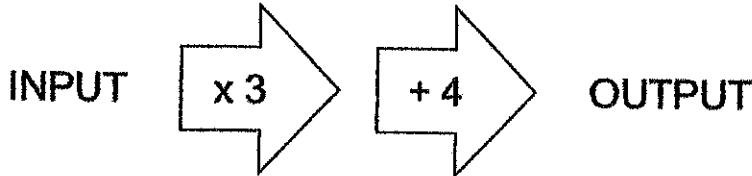
(a) When the input is -4, what is the output?

....

(1)

(b) If the output is 25, what was the input?

....

(1)

(c) If the input is n, what is the output?

....

(2)

(Total for Question is 4 marks)

2. You can use this rule to work out the total cost of hiring a car.

Total cost = £4 per hour plus £12

Arun hires a car for 5 hours.
(a) Work out the total cost.

£...

(2)

Raj hires a car.
The total cost is £40
(b) Work out how many hours Raj hires the car for.

.... hours

(3)

(Total for Question is 5 marks)

3. (a) Solve $6g = 18$

$g = \dots\dots\dots\dots\dots$

(1)

(b) Solve $5h + 7 = 17$

$h = \dots\dots\dots\dots\dots$

(2)

(Total for Question is 3 marks)

4. (a) Solve $x + 9 = 19$

$x = \dots\dots\dots\dots\dots$

(1)

(b) Solve $2y = 17$

$y = \dots\dots\dots\dots\dots$

(1)

(c) Solve $w/4 = 8$

$w = \dots\dots\dots\dots\dots$

(1)

(Total for Question is 3 marks)

5. (a) Solve $\dfrac{n}{7} = 2$

$n = \dots\dots\dots\dots\dots$

(1)

(b) Solve $3g + 4 = 19$

$g = \dots\dots\dots\dots\dots$

(2)

(Total for Question is 3 marks)

Things to remember:
- "Solve" means to find the value of the variable (what number the letter represents).
- The inverse of + is − and the inverse of x is ÷
- Work one step at a time, keeping you = signs in line on each new row of working.
- Expand any brackets first

Questions:

1. Solve $4x + 3 = 19$

x =............................
(Total 2 marks)

2. (a) Solve $6x - 7 = 38$

x = ...
(2)

(b) Solve $4(5y - 2) = 40$

y = ...
(3)
(Total 5 marks)

3. Solve $5(2y + 3) = 20$

y = ...
(Total 3 marks)

4. (a) Solve $7x + 18 = 74$

x = ...

Types of Shapes and their Properties

Things to remember:
- Sides and vertices belong on 2D shapes.
- Edges, faces and vertices belong on 3D shapes.

Questions:

1. Here is a triangular prism.
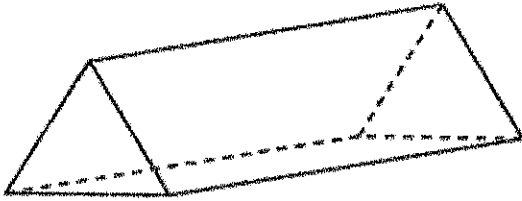
    (a)   For this prism, write down
           (i)   the number of edges

           (ii)   the number of faces

....

....

(2)
(Total for Question is 2 marks)

2. Here is a cuboid.
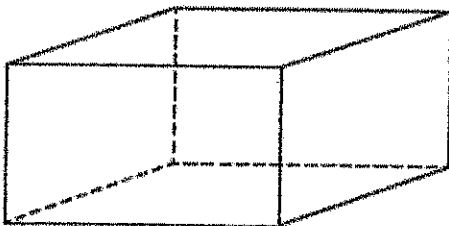
    The following sentences are about cuboids.

    Complete each sentence by writing the correct number in the gap.

    (i)   A cuboid has .... faces.

    (ii)   A cuboid has .... edges.

    (iii)   A cuboid has .... vertices.

(Total for Question is 3 marks)

6. Here are some solid 3-D shapes.
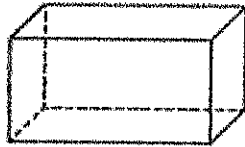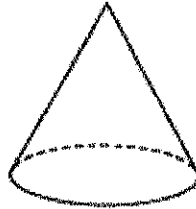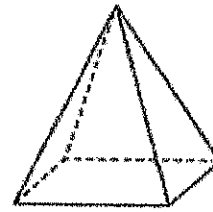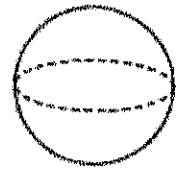
A   B   C   D   E

(a) Write down the letter of the shape that is a sphere.

....

(1)

(b) Write down the mathematical name of shape **A**.

....

(1)

(c) How many faces does shape **B** have?

....

(1)

(d) How many edges does shape **D** have?

....

(1)

(Total for Question is 4 marks)

Area and Perimeter of Triangles

Things to remember:
- Area of a rectangle = base x height
- Area of a triangle = ½ x base x height
- The perimeter is the distance around the outside of shape
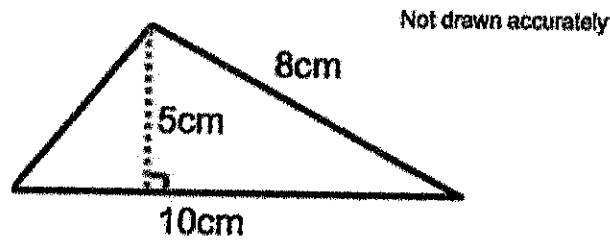
Find the areas of the two triangles below:
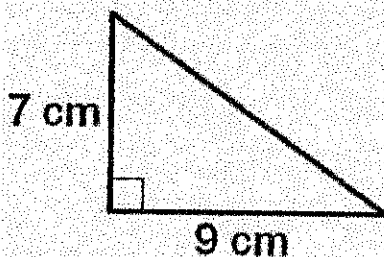
7 cm   5.2 cm

9 cm   12.4 cm

$A = \dfrac{b \times h}{2}$

$= \dfrac{9 \times 7}{2}$

$= 31.5 \text{ cm}^2$

$A = \dfrac{b \times h}{2}$

$= \dfrac{12.4 \times 5.2}{2}$

$= 32.24 \text{ cm}^2$

Questions:

Not drawn accurately

8cm

5cm

10cm
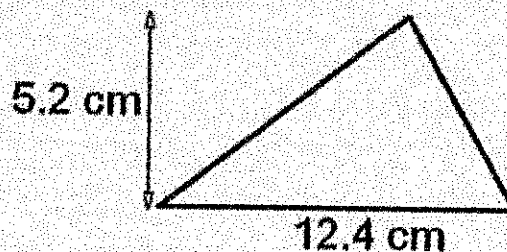
Calculate the area of the triangle.

..........................cm²
(2)

4cm

Not drawn accurately

7cm
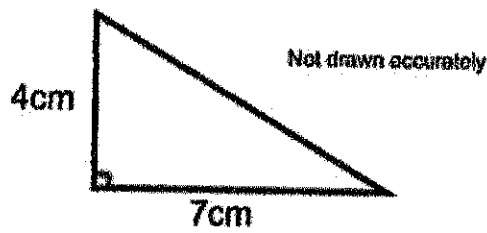
Work out the area of the right-angled triangle.

..........................cm²
(2)

Below is a right-angled triangle and a rectangle.

12cm   13cm

x cm

10cm

5cm
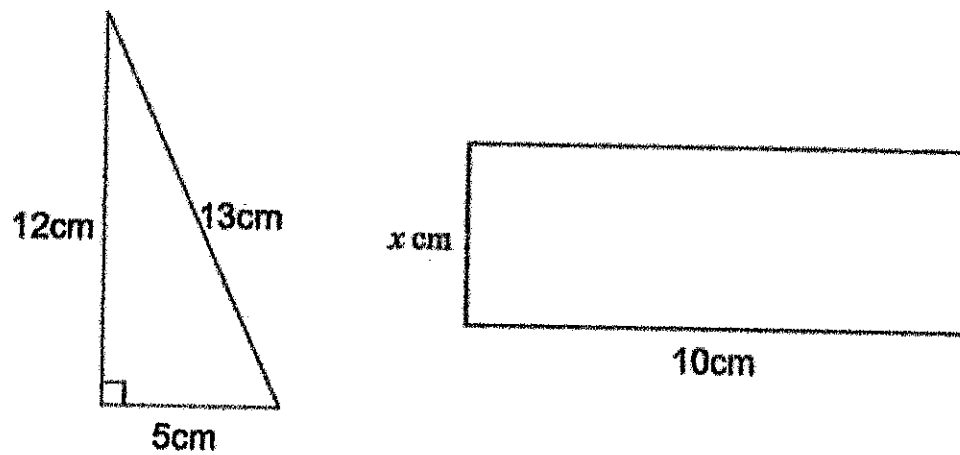
The area of the right-angled triangle is equal to the area of the rectangle.

Calculate x

Measures

Things to remember:
- 1cm = 10mm
- 1m = 100cm
- 1litre = 1000ml
- 1kg = 1000kg

Questions:

1. (a)   Change 4 kg to grams.

.... grams

    (b)   Change 3500 ml to litres.

.... litres
(2)
(Total for Question is 2 marks)

2. (a)   Write 3 metres in centimetres.

.... centimetres
(1)

    (b)   Write 4000 grams in kilograms.

.... kilograms
(1)

    (c)   Write 700 millilitres in litres.

.... litres
(1)
(Total for question = 3 marks)

Averages

Things to remember:
- Mode is most – the number that occurs the most frequently.
- Median is middle – put the numbers in order then identify the middle number.
- Mean is mean to work out – add all the numbers together and divide by the quantity in the list.
- Range is the difference from the biggest to the smallest.

Questions:

1.   Chloe made a list of her homework marks.
     4   5   5   5   4   3   2   1   4   5
     (a)   Write down the mode of her homework marks.

....
(1)

     (b)   Work out her mean homework mark.

....
(2)
(Total 3 marks)

2. Peter rolled a 6-sided dice ten times.
Here are his scores.

3   2   4   6   3   3   4   2   5   4

(a)   Work out the median of his scores.

....
(2)

(b)   Work out the mean of his scores.

....
(2)

(c)   Work out the range of his scores.

....
(1)
(Total 5 marks)

3. Mr Smith kept a record of the number of absences for each student in his class for one term.
Here are his results.

0   0   0   8   4   5   5   3   2   1

(a)   Write down the mode.

....
(1)

(b)   Work out the mean.

....
(2)
(Total 3 marks)

4. Here are ten numbers.

7   6   8   4   5   9   7   3   6   7

(a)   Work out the range.

....
(2)

(b)   Work out the mean.

....
(2)
(Total 4 marks)

5. Here are the test marks of 6 girls and 4 boys.

Girls: 5   3   10   2   7   3
Boys: 2   5   9   3

(a)   Write down the mode of the 10 marks.

....
(1)

(b)   Work out the median mark of the **boys**.

....
(2)

(c)   Work out the range of the **girls** marks.
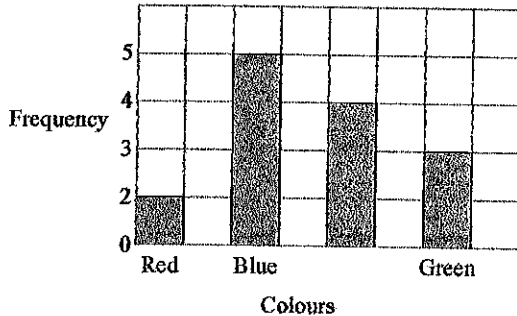
....
(1)

Tally Charts and Bar Graphs

Things to remember:

- Frequency means total.
- If you are drawing a bar chart, the axes must be labelled and **GAPS BETWEEN BARS**

Questions:

1. Ray and Clare are pupils at different schools. They each did an investigation into their teachers' favourite colours. Here is Ray's bar chart of his teachers' favourite colours.
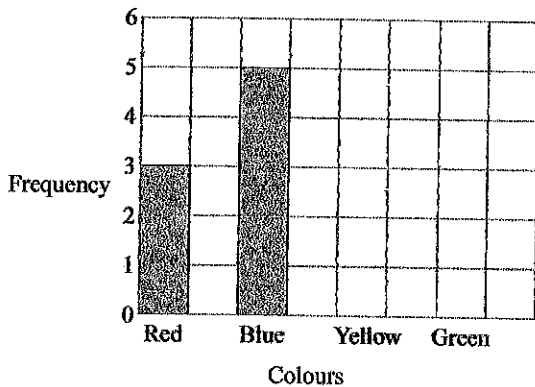

(a) Write down two things that are wrong with Ray's bar chart.

....

....

(2)

Clare drew a bar chart of her teachers' favourite colours. Part of her bar chart is shown below.



4 teachers said that Yellow was their favourite colour.
2 teachers said that Green was their favourite colour.

(b) Complete Clare's bar chart.

(2)

(c) Which colour was the mode for the teachers that Clare asked?

....

(1)

(d) Work out the number of teachers Clare asked.

....

(1)

(e) Write down the fraction of the number of teachers that Clare asked who said Red was their favourite colour.

....

(1)

(Total 7 marks)

2. Here is a bar chart showing the number of hours of TV that Helen and Robin watched last week.

Hours of TV watched last week
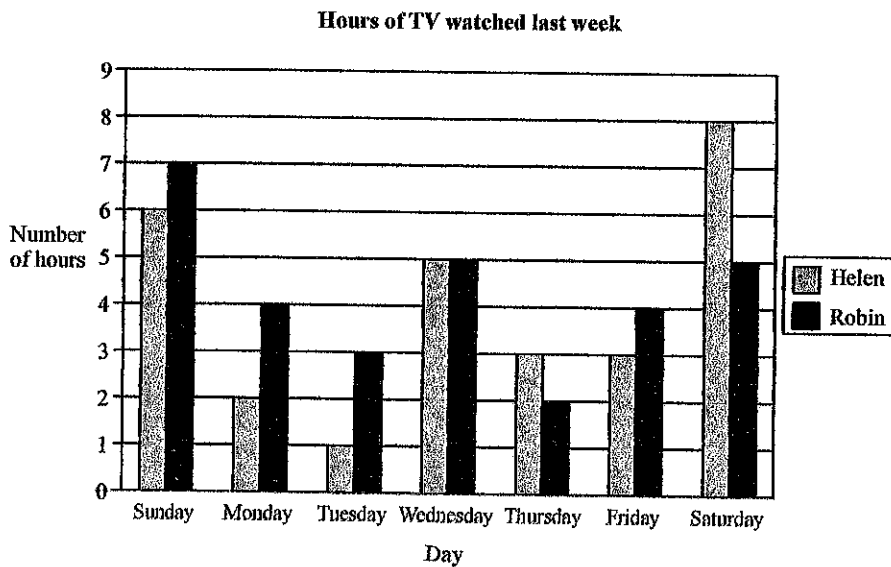
(a) Write down the number of hours of TV that Helen watched on Monday.

..............................hours

(1)

(b) On which day did Helen and Robin watch the same number of hours of TV?

....

(1)

(c) (i) Work out the total number of hours of TV that Robin watched on Friday and Saturday.

..............................hours

(ii) Who watched the greater number of hours of TV on Friday and Saturday? Show your working.

(3)
(Total 5 marks)

Probability

Things to remember:
- Probability can be expressed as a fraction, decimal or percentage. Do not write it as a ratio.
- All probabilities of an event will add up to 1.

Questions:
1. Kevin buys one raffle ticket.
A total of 350 raffle tickets are sold.
One of these tickets will win the raffle.
Each ticket has an equal chance of winning the raffle.
  Write down the probability that Kevin's ticket will win the raffle.

....

(Total 1 mark)

2. A company makes hearing aids.
  A hearing aid is chosen at random. The probability that is has a fault is 0.09
  Work out the probability that a hearing aid, chosen at random, will **not** have a fault.

....

(Total 1 mark)

3. The diagram shows a fair spinner in the shape of a rectangular octagon.
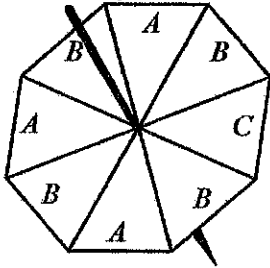
The spinner can land on A or B or C. Marc spins the spinner.
Write down the probability that the spinner will land on A.

....

4. A bag contains some beads which are red or green or blue or yellow.
The table shows the number of beads of each colour.

Colour	Red	Green	Blue	Yellow
Number of beads	3	2	5	2

Samire takes a bead at random from the bag.
Write down the probability that she takes a blue bead.

....

5. Richard has a box of toy cars.
Each car is red or blue or white.
3 of the cars are red. 4 of the cars are blue. 2 of the cars are white.
Richard chooses one car at random from the box.
Write down the probability that Richard will choose a blue car.

....

6. 60 British students each visited one foreign country last week.
The two-way table shows some information about these students.

	France	Germany	Spain	Total
Female			9	34
Male	15			
Total		25	18	60

(a) Complete the two-way table.

(3)

One of these students is picked at random.
(b) Write down the probability that the student visited Germany last week.

....

(1)

Simplifying Ratios

Things to remember:
- Divide both parts of the ratio by the same factor until in its simplest form.

Questions:

1. Write the ratio 2 : 6 in its simplest form.

....
(1)
(Total for Question is 3 marks)

2. Ewen has 48 white tiles and 16 blue tiles.
   (a) Write down the ratio of the number of white tiles to the number of blue tiles.
       Give your ratio in its simplest form.

....
(2)

   The cost of each white tile was £2
   The cost of each blue tile was £4
   (b) Work out the ratio of the total cost of the white tiles to the total cost of the blue tiles.

....
(2)
(Total for question = 4 marks)

3. There are 140 students at Walbridge school.
   80 of the students walk to school.
   60 of the students cycle to school.
   Write the ratio of the number of students who walk to school to the number of students who cycle to school.
   Give your ratio in its simplest form.

....
(Total for Question is 2 marks)

4. There are only red counters and blue counters in a bag.
   The ratio of the number of red counters to the number of blue counters is 4 : 6
   Write this ratio in its simplest form.

....
(Total for question = 1 mark)

Simplifying Fractions and Fractions of Amounts

- Divide both the numerator (top) and denominator (bottom) of the fraction by the same factor until in its simplest form.
- To find a fraction of an amount, divide the amount by the denominator, then multiply by the numerator.

Questions:

1. Sam has £480
    He spends   of the £480
    Work out how much money Sam has left.

    £ ....

    (Total for Question is 3 marks)

2. The normal price of a denim shirt at a shop is £9.60

    On Special Offer Day, there is $\frac{1}{3}$ off the normal price.

    Special Offer Day

    $\frac{1}{3}$ off normal prices

    Billy has £13
    Has he enough money to buy two denim shirts on Special Offer Day?
    You must show all your working.

    (Total for Question is 4 marks)

*5. Here are two fractions.

$\frac{2}{3}$ $\frac{7}{8}$

Which of these fractions has a value closer to $\frac{3}{4}$?
You must show clearly how you get your answer.

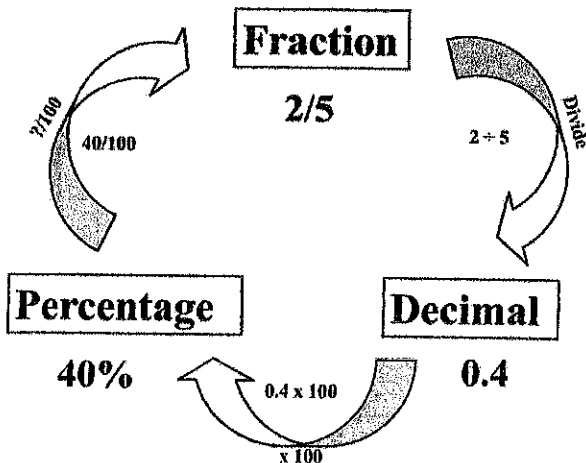**(Total for Question is 3 marks)**

6. Why does   ?

....

....

(Total for Question is 2 marks)

8. Write 35 out of 65 as a fraction.
Give your fraction in its simplest form.

....

(Total for question = 2 marks)

Fractions, Decimals and Percentages

MathsWatch Clip: 85

Things to remember:

Fraction 2/5

2 ÷ 5

40/100

Decimal 0.4

Percentage 40%

0.4 x 100

x 100

Questions:

1.   (a)   Write 0.1 as a fraction.

....
(1)

   (b)   Write ¼ a decimal.

....
(1)
(Total for Question is 2 marks)

$$\frac{3}{4}$$

2.   (a)   Write 4 as a decimal.

....
(1)

   (b)   Write 0.3 as a fraction.

....
(1)
(Total for Question is 2 marks)

$$\frac{1}{4}$$

3.   (a)   Write 4 as a decimal.

....
(1)

   (b)   Write 0.15 as a fraction.

....
(1)

   (c)   Write 17 out of 40 as a fraction.

....
(1)
(Total for question = 3 marks)

4.   (a)   Write 7/10 as a decimal.

....
(1)

   (b)   Write 0.45 as a percentage.

....
(1)

   (c)   Write 30% as a fraction.
         Give your fraction in its simplest form.

....
(2)
(Total for Question is 4 marks)

5.   (a)   Write 0.7 as a fraction.

....
(1)

   (b)   Write 0.3 as a percentage.

....
(1)

   (c)   Write 8/12 in its simplest form.

....
(1)
(Total for Question is 3 marks)

6. Write these numbers in order of size. Start with the smallest number.

75% $\dfrac{7}{8}$ 0.25 $\dfrac{1}{2}$ $\dfrac{2}{3}$

....

(Total for question = 2 marks)

7. Write these numbers in order of size. Start with the smallest number.

0.6 $\dfrac{2}{3}$ 65%   0.606

....

Sketching Linear Graphs

MathsWatch Clip: 96

Things to remember:
- Draw a table of values with x and y.
- Work out the value of y when x = 0, x = 1, x = 2, then use the pattern to work out the rest.
- Don't forget to connect the coordinates with a straight line.

Question:

1. (a) Complete the table of values for $y = 3x + 4$

x	−2	−1	0	1	2	3
y		1				13

(b) On the grid, draw the graph of $y = 3x + 4$

(2)

(SEE NEXT PAGE)
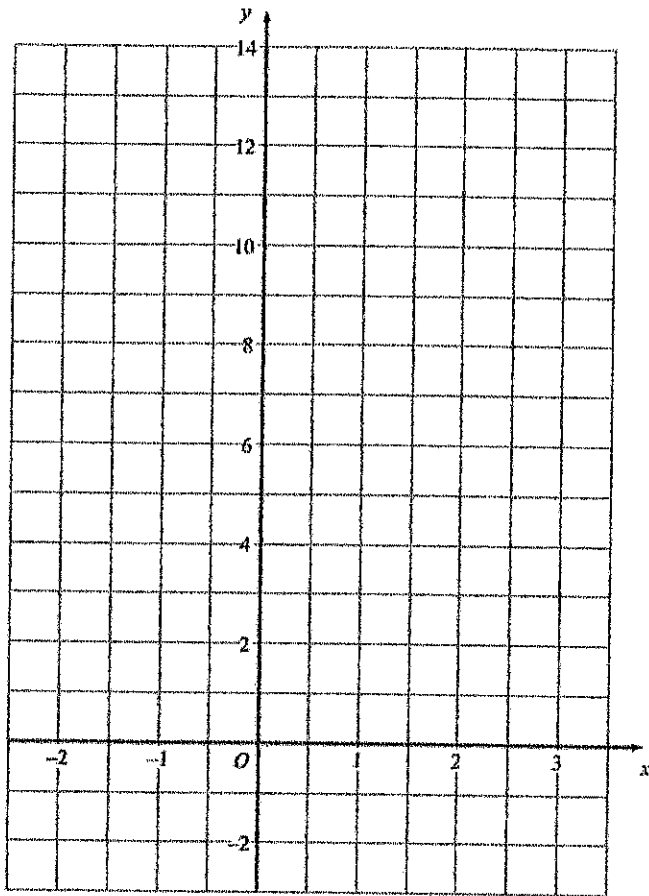
2.　　(a)　　Complete the table of values for $y = 2x + 2$

x	−2	−1	0	1	2	3	4
y	−2				6		

(b)　　On the grid, draw the graph of $y = 2x + 2$

(SEE NEXT PAGE)
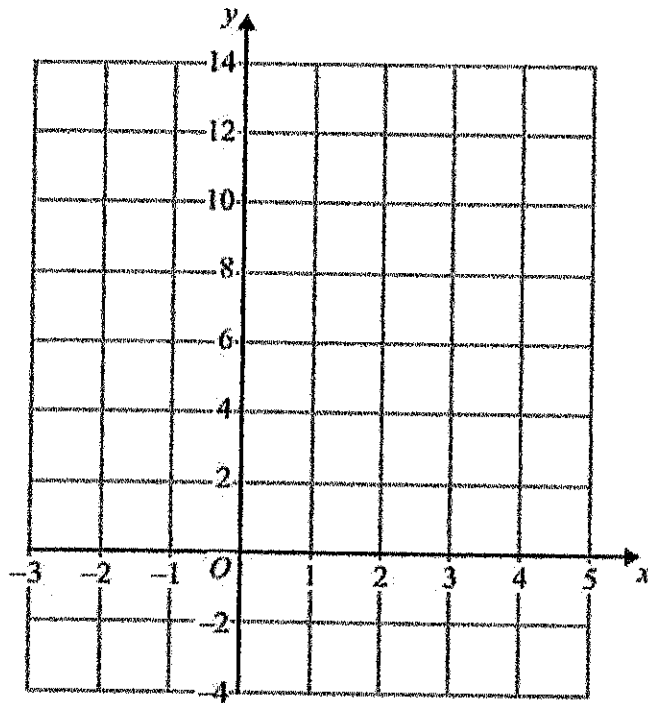
Circles

Things to remember:
- πr^2 sounds like area to me, when I need the circumference I'll just use πD.
- Read the question carefully and check if you are being asked to find circumference or area and whether they have given you the radius or the diameter.
- Remember the diameter is twice the radius.

Questions:

1. The diameter of a wheel on Harry's bicycle is 0.65 m.
    Calculate the circumference of the wheel.
    Give your answer correct to 2 decimal places.
    Diagram NOT accurately drawn

0.65 m
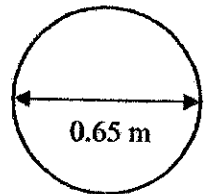
.... m
(Total 2 marks)

2. Diagram NOT accurately drawn
    The radius of this circle is 8 cm.
    Work out the circumference of the circle.
    Give your answer correct to 2 decimal places.

8 cm

.... cm
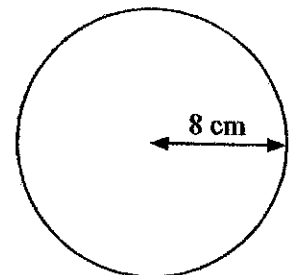
3. Diagram NOT accurately drawn
The radius of the circle is 9.7 cm.
Work out the area of the circle.
Give your answer to 3 significant figures.

9.7 cm
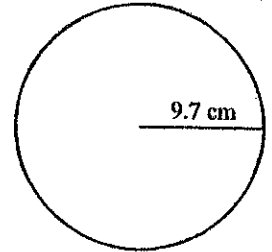
.... cm²
(Total 2 marks)

4. A circle has a radius of 6.1 cm.
Work out the area of the circle.

6.1 cm
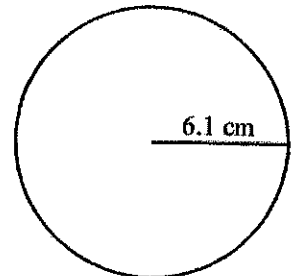
....
(Total 3 marks)

Volume and Surface Area of Prisms

MathsWatch Clip: 114, 119

Things to remember:
- Volume of a prism = area of cross section x length
- The surface area is the area of the surface (calculate the area of each face then add together)

2. The diagram shows the area of each of three faces of a cuboid.
Diagram **NOT** accurately drawn
The length of each edge of the cuboid is a whole number of centimetres.
Work out the volume of the cuboid.

21 cm²

35 cm²   15 cm²
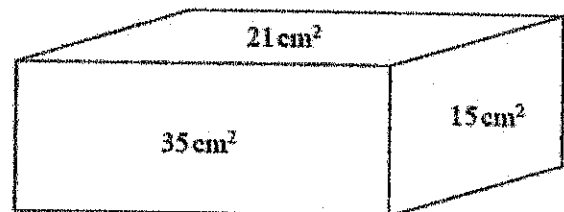
....cm³
(Total for question = 4 marks)

3. The diagram shows a triangular prism.
Work out the volume of the prism.

Diagram NOT accurately drawn

10 cm

5 cm

6 cm

....
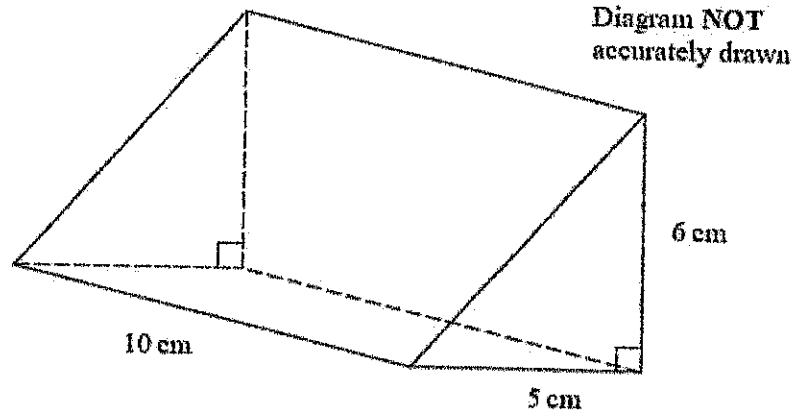
(Total for question = 3 marks)

Relative Frequency

Things to remember:
- Probabilities of exhaustive events sum to 1
- To calculate relative frequency, multiply the number of trials by the given probability

Questions:

1. An electronic game can show red or blue or green or yellow.
The table shows the probabilities that the colour shown will be red or will be green or will be yellow.

Colour	red	blue	green	yellow
Probability	0.15		0.41	0.24

Arthur plays the game.

(a) Work out the probability that the colour shown will be blue.

....

(2)

Janice is going to play the game 50 times.

(b) Work out an estimate for the number of times the colour shown will be yellow.

....

(2)

(Total for question = 4 marks)

4. The probability that a pea plant will grow from a seed is 93%.
Sarah plants 800 seeds.
Work out an estimate for the number of seeds that will grow into pea plants.

....

(Total for Question is 2 marks)

5. Rhiana plays a game.
   The probability that she will lose the game is 0.32
   The probability that she will draw the game is 0.05
   Rhiana is going to play the game 200 times.
   Work out an estimate for the number of times Rhiana will win the game.

   ....
   (Total for Question is 3 marks)

6. The probability that a biased dice will land on a five is 0.3
   Megan is going to roll the dice 400 times.
   Work out an estimate for the number of times the dice will land on a five.

   ....
   (Total for Question is 2 marks)

Dividing into a Ratio

MathsWatch Clip: 106

Things to remember:
- Start by dividing the quantity by the total number of parts, then multiply by each share.
- Don't forget to include units throughout your working.

Questions:
1. Keith and Graham share £105 in the ratio 4:3
   Work out how much Keith gets.

   ....
   (Total for Question is 2 marks)

3. Liam, Sarah and Emily shared some money in the ratio 2 : 3 : 7
   Emily got £80 more than Liam.
   How much money did Sarah get?

   ....
   (Total for question = 3 marks)

4. A pile of sand has a weight of 60 kg.
The sand is put into a small bag, a medium bag and a large bag in the ratio 2 : 3 : 7
Work out the weight of sand in each bag.

small bag .... kg

medium bag .... kg

large bag .... kg

(Total for Question is 3 marks)

6. Graham and Michael share £35 in the ratio 5 : 2
Work out the amount of money that Graham gets.

£ ....

(Total for Question is 2 marks)

Percentages of Amounts, Increasing and Decreasing
MathsWatch Clip: 86,87,108

Things to remember:
- "Per cent" means "out of 100".
- Increase means the value will go up, decrease means the value will go down.

Questions:
1. David is going to buy a cooker.
The cooker has a price of £320
David pays a deposit of 15% of the price of the cooker.
How much money does David pay as a deposit?

£ ....

(Total for Question is 2 marks)

2. Work out 65% of 300

....

(Total for question = 2 marks)

*3. Barak is going to buy 550 nails from one of these companies.

Nail Company	Hammer Company
50 nails	25 nails
£4.15 plus VAT at 20%	£2.95
	Special offer Buy 100 get 25 free

He wants to buy the nails at the cheaper cost.
Where should he buy the nails, from the Nail Company or the Hammer Company?

(Total for question = 5 marks)

4. Greg sells car insurance and home insurance.
The table shows the cost of these insurances.

Insurance	car insurance	home insurance
Cost	£200	£350

Each month Greg earns
    £530 basic pay
    5% of the cost of all the car insurance he sells
and   10% of the cost of all the home insurance he sells
In May Greg sold
    6 car insurances
and   4 home insurances
Work out the total amount of money Greg earned in May.

£ ....

(Total for Question is 5 marks)

Standard Form

Things to remember:
- a x 10^b

$$1 \le a < 10$$

1.

(a) Write the number 1 440 000 in standard form.

....

(1)

(Total 1 marks)

2. A nanosecond is 0.000 000 001 second.

(a) Write the number 0.000 000 001 in standard form.

....

(1)

A computer does a calculation in 5 nanoseconds.

(b) How many of these calculations can the computer do in 1 second?
Give your answer in standard form.

....

(2)

(Total 3 marks)

3. (a) (i) Write 40 000 000 in standard form.

(ii) Write 3 x 10^{-5} as an ordinary number.

....

....

(2)

5. (a) Write the number 40 000 000 in standard form.

....

(1)

(b) Write 1.4 × 10^{-5} as an ordinary number.

....

(1)

6. Write in standard form

(a) 456 000

....

(1)

(b) 0.00034

....

(1)

(c) 16 × 10^7

....

(1)

(Total 3 marks)

7. (a) Write 5.7× 10^{-4} as an ordinary number.

....

Expanding

Things to remember:
- Use FOIL (first, outside, inside, last) or the grid method (for multiplication) to expand brackets.

Expand and simplify

$(x + 3)(x + 2) = x^2 + 2x + 3x + 6$
$= x^2 + 5x + 6$

$(x + 5)(x + 1) = x^2 + 1x + 5x + 5$
$= x^2 + 6x + 5$

Questions:

1. Expand and simplify $(m + 7)(m + 3)$

....
(Total for question = 2 marks)

2. (a) Expand $4(3x + 5)$

....
(1)

(b) Expand and simplify $2(x - 4) + 3(x + 5)$

....
(2)

(c) Expand and simplify $(x + 4)(x + 6)$

....
(2)
(Total for Question is 5 marks)

3. (a) Expand $3(2 + t)$

....
(1)

(b) Expand $3x(2x + 5)$

....

(c)   Expand and simplify $(m + 3)(m + 10)$

<div align="right">(2)</div>

....
<div align="right">(2)</div>
<div align="right">**(Total for Question is 5 marks)**</div>

Rearranging Formulae

<div align="right">**MathsWatch Clip: 136**</div>

Things to remember:
- Firstly decide what needs to be on its own.
- Secondly move all terms that contain that letter to one side. Remember to move all terms if it appears in more than one.
- Thirdly separate out the required letter on its own.

Questions:

1.   Make t the subject of the formula $v = u + 5t$

$t =$ ....

<div align="right">(2)</div>
<div align="right">**(Total 5 marks)**</div>

Rearrange the following formulae to make x the subject of the formula

a) $y = 3x$

d) $y = 4x + 5$

b) $y = x + 7$

e) $y = \dfrac{x + 2}{3}$

c) $y = 2x - 1$

f) $y = 2(x - 7)$

Angles

Things to remember:
- Angles in a triangle sum to 180°
- Angles on a straight line sum to 180°
- Angles around a point sum to 360°
- Vertically opposite angles are equal
- Alternate angles are equal
- Corresponding angles are equal
- Supplementary angles sum to 180°
- An exterior and an interior angle of a polygon sum to 180°
- An exterior angle = 360° ÷ number of sides

Questions:

1. *PQ* is a straight line.

Dia ram **NOT**
accurately drawn
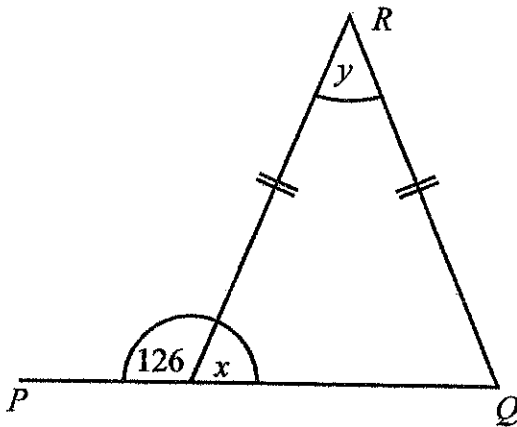
(a) Work out the size of the angle marked $x°$.

.............................°

(1)

(b) (i) Work out the size of the angle marked $y°$.

.............................°

(ii) Give reasons for your answer.

....

....

(3)
(Total 4 marks)

2. Triangle *ABC* is isosceles, with *AC = BC*.
Angle *ACD* = 62°.
BCD is a straight line.

Dia ram **NOT**
accurately drawn
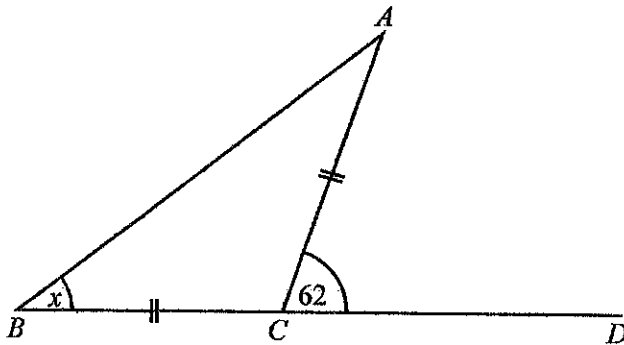
(a) Work out the size of angle *x*.

X = ...°

(2)

Loci and Construction

Things to remember:
- The question will always say "use ruler and compasses" – if you don't you will lose marks.
- Sometimes there are marks for drawing something that is almost right, so always have a guess if you can't remember.
- Bisector means "cut in half"

Questions:

1.
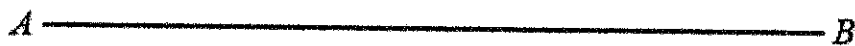
Use ruler and compasses to **construct** the perpendicular bisector of the line segment *AB*.
You must show all your construction lines.

(Total for question = 2 marks)

2. The diagram shows the plan of a park.
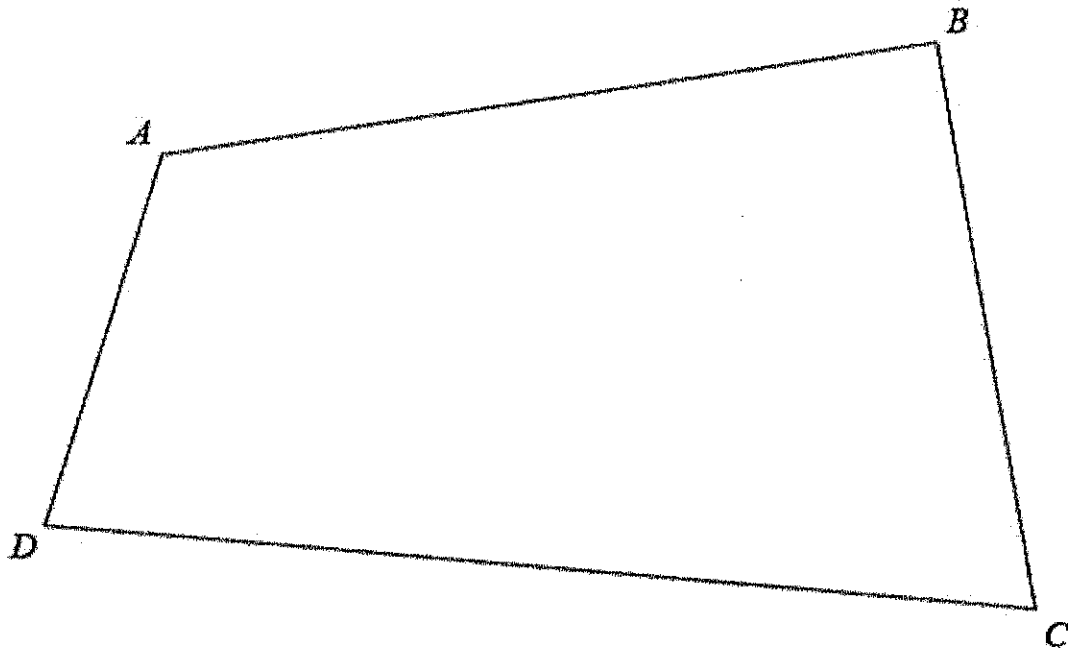
Scale: 1 cm represents 100 m

A fountain in the park is equidistant from A and from C. The fountain is exactly 700 m from D.

On the diagram, mark the position of the fountain with a cross (×).

(Total for question = 3 marks)

3. Here is a scale drawing of an office.
The scale is 1 cm to 2 metres.
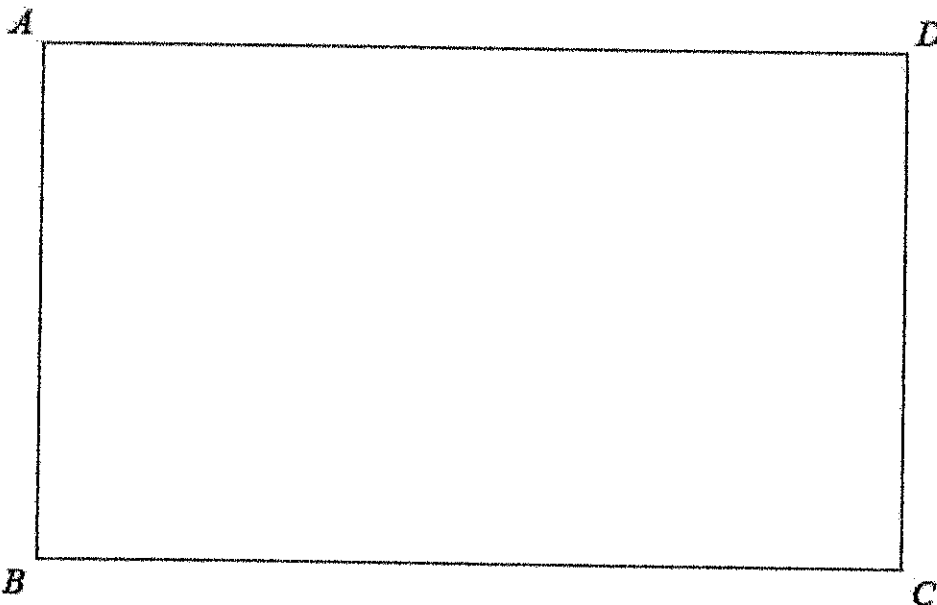
A photocopier is going to be put in the office.
The photocopier has to be closer to B than it is to A.
The photocopier also has to be less than 8 metres from C.
Show, by shading, the region where the photocopier can be put.

(Total for question = 3 marks)

Enlargements

Things to remember:
- Enlargement – the shape is made bigger or smaller by a scale factor from a centre.

1.
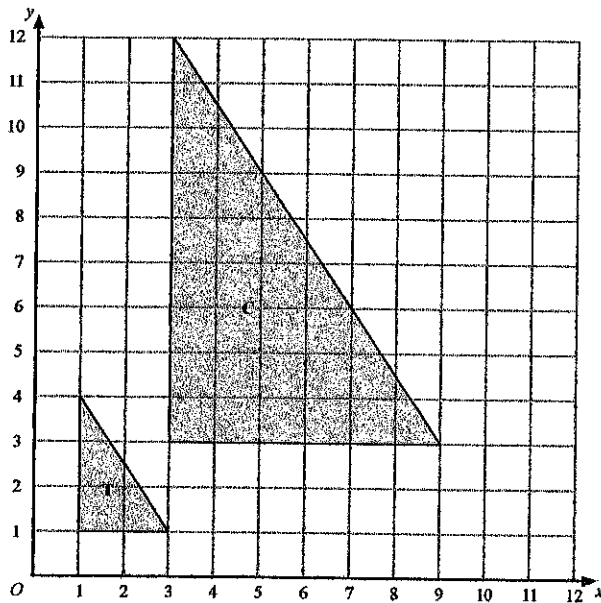
(a)   Describe fully the single transformation which maps triangle T onto triangle C.

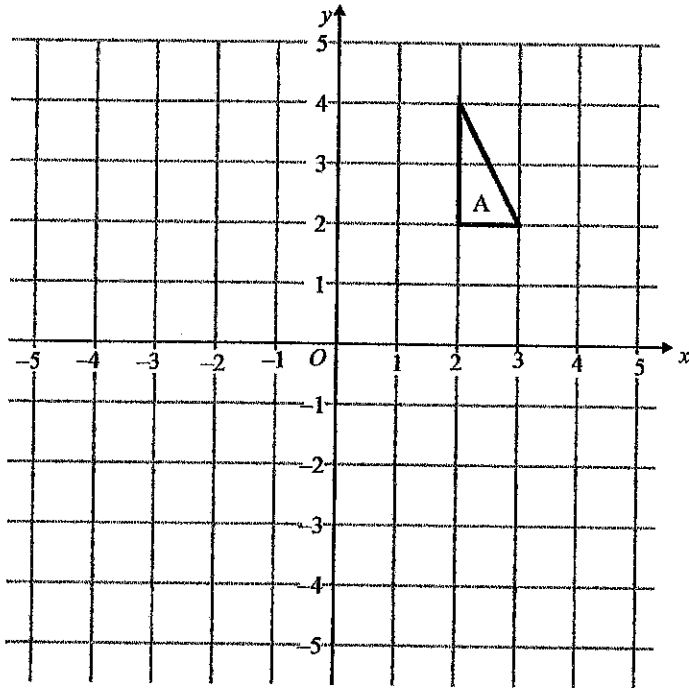..

(3)
(Total 6 marks)

2.
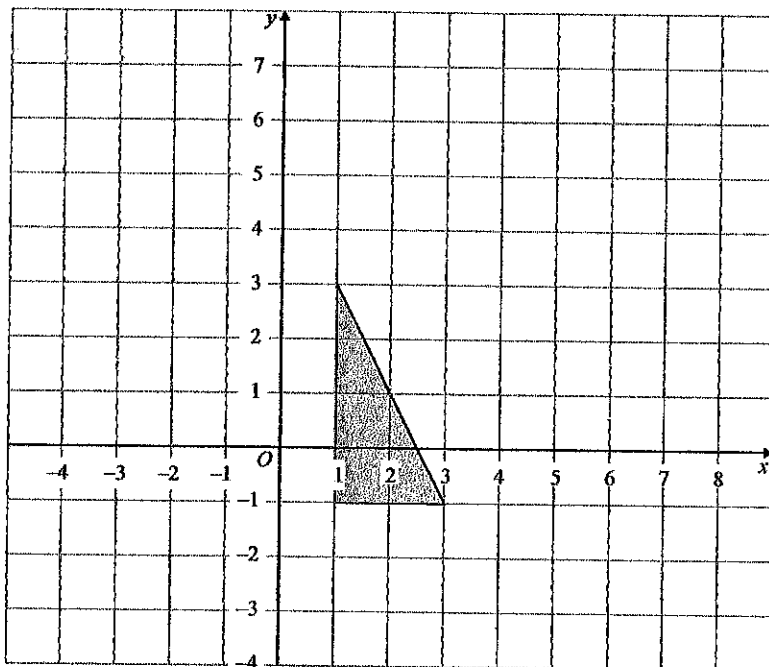
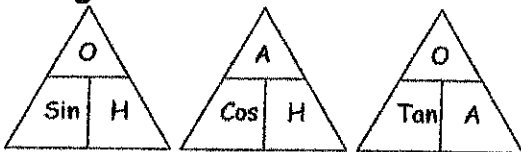Enlarge the shaded triangle by a scale factor 2, centre (0,0).

(Total 3 marks)

3.

Trigonometry – SOH CAH TOA (Missing Angles)

Things to remember:
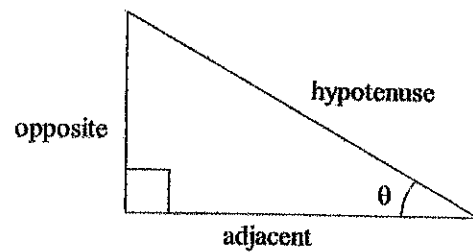
1.   Label your sides first, you'll need O, H and A...
2.   Choose if you need SOH, CAH or TOA...
3.   Cover the one you need with your thumb,
4.   Write the equation,
5.   Solve it, then you're done!

Questions:

1. *PQR* is a triangle.
   Angle *PQR* = 90°.
   PQ = 12.5 cm.
   QR = 5 cm.
   Calculate the value of *x*.
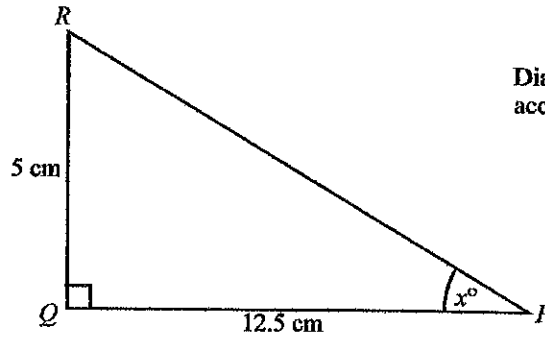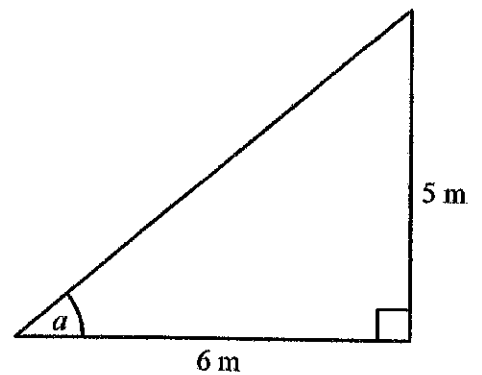   Give your answer correct to 1 decimal place.

R

Diagram **NOT**
accurately drawn

5 cm

x°

Q   12.5 cm   *P*

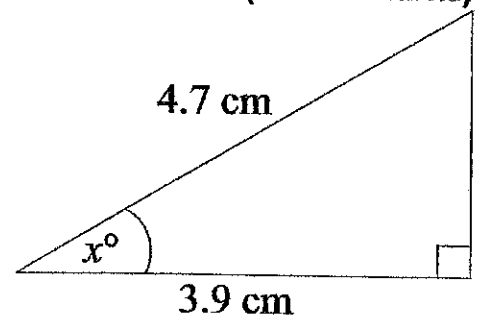.. °

(Total 3 marks)

4. (a) Calculate the size of angle *a* in this right-angled triangle.
   Give your answer correct to 3 significant figures.
   Diagram **NOT** accurately drawn

5 m

a

6 m

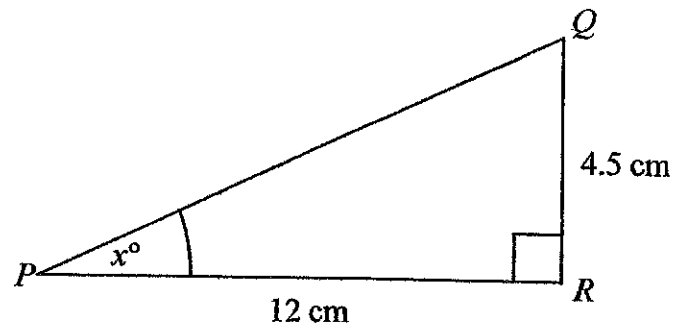.. °

(3)

(Total 6 marks)

5. Diagram **NOT** accurately drawn
   Work out the value of *x*.
   Give your answer correct to 1 decimal place.

4.7 cm

x°

3.9 cm

.... °

(Total 3 marks)

7. Diagram **NOT** accurately drawn
PQR is a right-angled triangle.
PR = 12 cm.
QR = 4.5 cm.
Angle *PRQ* = 90°.
Work out the value of *x*.
Give your answer correct to one decimal place.

4.5 cm

12 cm

.... °
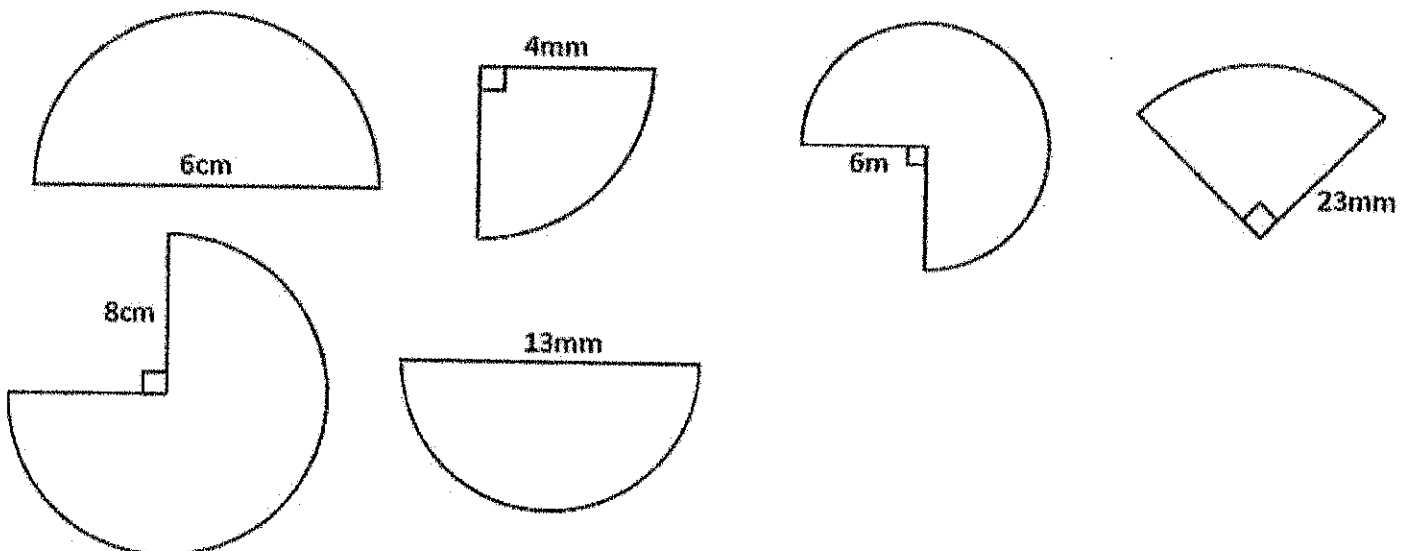
(Total 3 marks)

Area of Sectors

MathsWatch Clip: 167

Things to remember:
- Area of a circle = πr^2
- To find the area of a semi -circle, find the area of the full circle, then divide by 2
- To find the area of a quarter-circle, find the area of the full circle, then divide by 4
-

Questions:

Find the area of the following sectors

6cm

4mm

6m

23mm

8cm

13mm

Proportion

Things to remember:
- Start by checking the question for squares, cubes and roots;
- "x is directly proportional to y" looks like **x = ky**
- "x is inversely proportional to y" looks like $x = \dfrac{k}{y}$

Questions:

1. *S* is inversely proportion to the square *f*.

    (a) Find a formula for *S* in terms of *f*.

3. *d* is directly proportional to the square of *t*.

    (a) Express *d* in terms of *t*.

    ....

    (3)

8. *f* is inversely proportional to *d*.
   Find a formula for *f* in terms of *d*.

    f = ...

    (Total 3 marks)

Calculating with Fractions

Things to remember:
- If you have a mixed number, start by converting it to an improper fraction.
- If you need to add or subtract fractions, you will need to start by finding equivalent fractions with a common denominator.
- Make sure you leave your answer in its simplest form.

Questions:

1. (a) Work out $\frac{3}{5} + \frac{1}{2}$

....
(2)

2. Work out $\frac{4}{5} + \frac{3}{7}$

Give your answer as a mixed number in its simplest form.

....
(3)

6. Work out $\frac{3}{8} + \frac{1}{3}$

....
(Total for Question is 2 marks

Percentages – reverse

Things to remember:

- Work out what the multiplier would have been;

```
┌──────────┐    x multiplier      ┌──────────┐
│ Original │  ───────────────►    │   New    │
│ amount   │  ◄───────────────    │  amount  │
└──────────┘    ÷ multiplier      └──────────┘
```
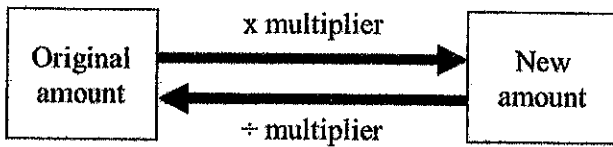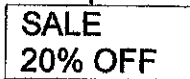
Questions:

1. Loft insulation reduces annual heating costs by 20%.
    After he insulated his loft, Curtley's annual heating cost was £520.
    Work out Curtley's annual heating cost would have been, if he had not insulated his loft.

    £ ....

    (Total 3 marks)

2. In a sale, normal prices are reduced by 20%.

SALE
20% OFF

    Andrew bought a saddle for his horse in the sale.
    The sale price of the saddle was £220.
    Calculate the normal price of the saddle.

    £ ....

    (Total 3 marks)

3. Hajra's weekly pay this year is £240
    This is 20% more than her weekly pay last year.
    Bill says 'This means Hajra's weekly pay last year was £192'.
    Bill is wrong,
    (a) Explain why.

    ....

    ....

    (1)

    (b) Work out Hajra's weekly pay last year.

£ ....

5. In a sale, normal prices are reduced by 25%.
    The sale price of a saw is £12.75
    Calculate the normal price of the saw.

£ ....