# FIRRHILL HIGH SCHOOL

## Mathematics Department

## S2/3 Homework Booklet

1 S1 Revision and Powers
2 Pythagoras
3 Circle
4 Circle 2
5 Solving Equations 1
6 Algebra 1 (Equations and Inequations and Changing the Subject)
7 Symmetry
8 Scientific Notation
9 Tolerance
10 Area and Surface Area
11 Volume
12 Algebra 2 (Breaking brackets and Common Factors)
13 Patterns and Sequences
14 Fractions, Decimals and Percentages
15 Gradient
16 Straight Line
17 Scale
18 Angles and Circles
19 Trigonometry
20 Money
21 Ratio and Proportion

## S2/3 (M) Maths Homework 1

Show all working

1) Evaluate,

a) $56.8 + 7.68$ b) $63.43 - 56.8$ c) $87.9 \times 8$

d) $78.05 \div 5$ e) $6.89 \times 3000$ f) $162 \div 60$

---

2) Evaluate

a) $5^2$ b) $4^3$ c) $12^2$ d) $1^5$

e) $\sqrt{64}$ f) $\sqrt{121}$ g) $7^0$ h) $\sqrt[3]{27}$

i) $\sqrt[3]{64}$ j) $\sqrt[3]{1000}$ k) $\sqrt[5]{1}$

---

3) Evaluate

a) $6 - 10$ b) $5 - (-7)$ c) $-12 + (-9)$ d) $27 - (-19)$

e) $(-3) \times 5$ f) $(-3) \times (-5)$ g) $28 \div (-4)$ h) $(-28) \div (-4)$

---

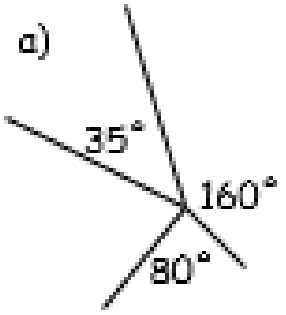
4) a) 20% of £6340 b) 45% of £523 c) $\frac{2}{3}$ of 48kg

d) $\frac{3}{8}$ of \$186 e) $\frac{1}{2}$ of $\frac{2}{3}$ of £99

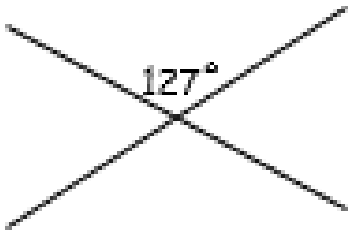
---

5) Copy each diagram and fill in all the missing angles.

a)




b)




---

6) Solve

a) $2x + 7 = 19$ b) $3a - 1 = 8$ c) $\frac{e}{4} = 5$

---

7) If $a = 2$ and $b = 3$, find the value of

a) $4a - 2b$ b) $b^2$ c) $5ab$ d) $4a^3b^3$

---

8) Round 567 832 to a) 5sf b) 2sf c) 1 sf

## S2/3 (M) Maths Homework 2

1) Evaluate,

a) $76 \times 30$ b) $9\,400 \div 200$ c) $17 \times 4000$

d) $8680 \div 70$ e) $843 \times 900$ f) $84\,000 \div 3000$

---

2) On the same Saturday in London there were 43 568 people at Stamford Bridge, 58 457 at the Emirates Stadium and 34 776 at Upton Park.

a) How many people attended these three games in total ?

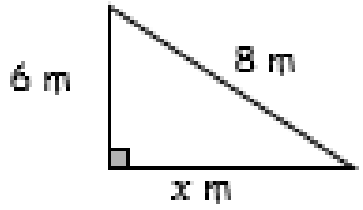
b) Find the difference between the Emirates Stadium and the Stamford Bridge attendances.

c) One in eight people at the Upton Park were not West Ham fans. How many people at that match were West Ham fans ?

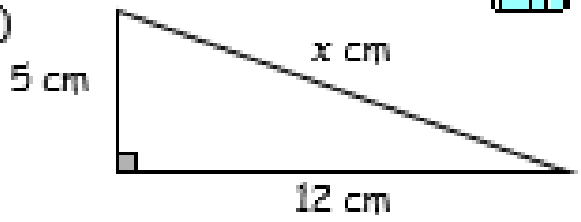
---

3) Find the length of the unknown side in each of these right angled triangles.

a)



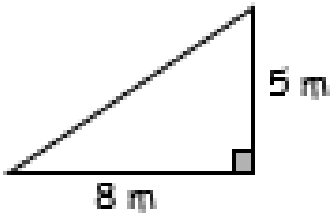

b)



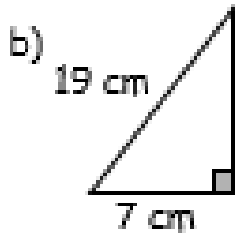

---

4) Find the perimeter of these triangles to one decimal place.

a)




b)




---

5) Which of these sums will have the bigger answer.

$312465 \div 473$ or $312466 \div 474$ ?

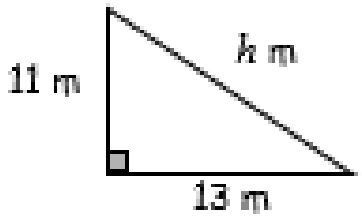
Explain your answer.

## S2/3 (M) Maths Homework 3

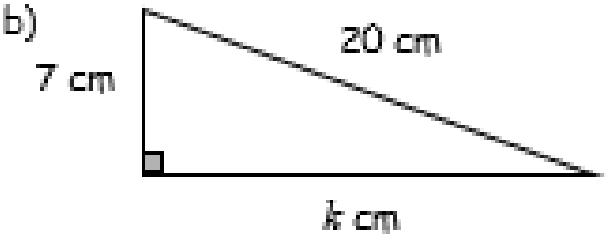
1) It costs £23 for one person to enter The Great North Run. How much would it cost for a charity to enter four hundred people for this race ?

2) Find the length of the unknown side in each of these right angled triangles, giving your answers to one decimal place.

a)



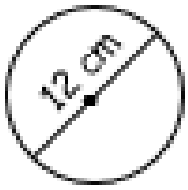

b)



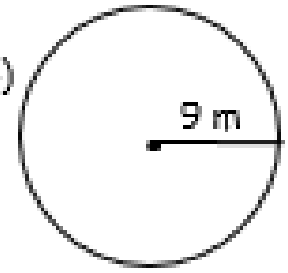

3) Find the area of this shape.


4) Calculate the area and the circumference of these circles.

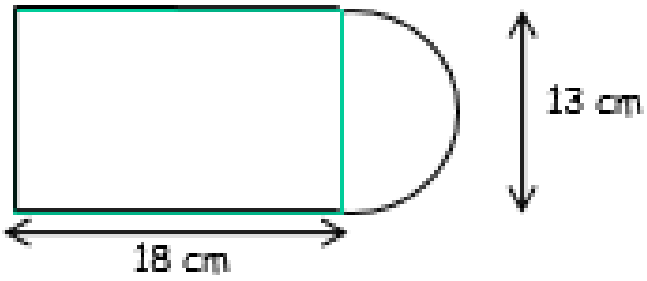
a)




b)




5) Find the area of this shape.

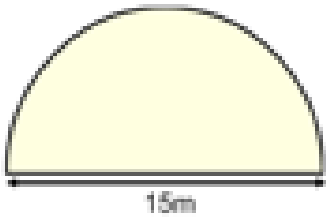



6) 480 people work in an office. Four fifths of them come to work by car. An eighth of them travel by bus. The rest of the staff walk to work.
How many people walk to work?

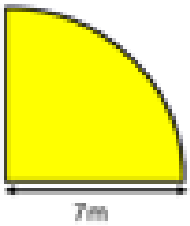
## S2/3 (M) Maths Homework 4

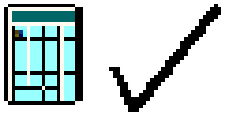
1.) Calculate the perimeter and area of these shapes

a)



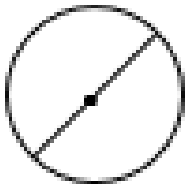

b)



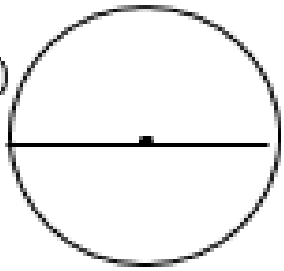
2) Calculate the diameter of these circles

a)

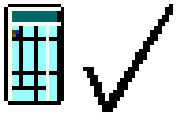


Circumference
= 22 cm

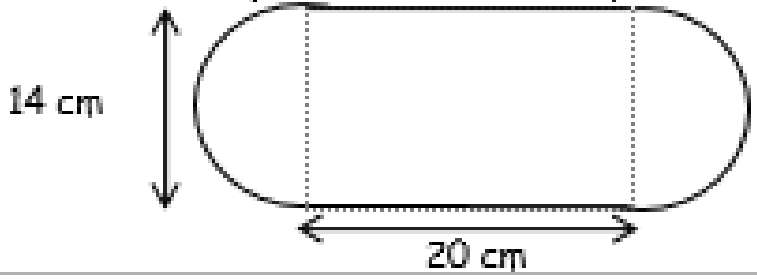
b)



Area
= 39 m²



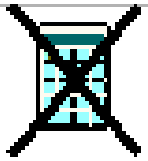
3) Find the perimeter of this shape.




4) Evaluate,

a) 47 x 20 b) 2400 ÷ 200 c) 13 x 6000

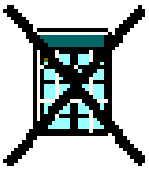
d) 2880 ÷ 80 e) 379 x 900 f) 84 000 ÷ 4000



5) Find:

a) 10% of 2500 b) 25% of 6488 c) 20% of 9975

d) 15% of 240 e) 17% of 3000 f) 82% of 3600



6) Calculate

a) $3^3 + 5^2 - (-1)^3$ b) $(\sqrt{25} - \sqrt{36})^2$ c) $10 + 10^2 + 10^3 + 10^4$ .

7. Solve

a) $2x + 5 = 12$ b) $4a - 9 = 2 - 3a$ c) $5 - 8d = 3d + 7$

## S2/3 (M) Maths Homework 5

1) Solve for $x$.

a) $5x + 7 = 32$ b) $6x - 3 = 15$

2) Solve.

a) $\frac{7c}{2} = 21$ b) $\frac{3b}{4} = 45$ c) $\frac{4t}{6} + 7 = 9$

3) Solve the equations.

a) $3(3a + 4) = 21$ b) $2(2v - 7) = 7$

4) Solve these equations.

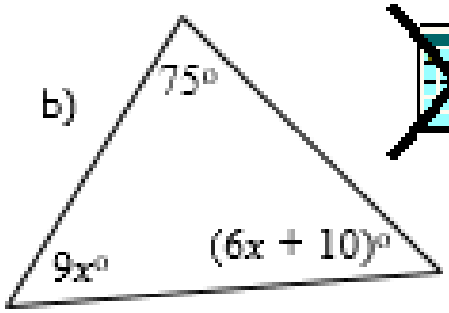
a) $2(x + 2) + 3(x + 4) = 31$ b) $3p - 6 = 14 + p$

c) $4(5a + 2) = 9(2a + 2)$

5) Make an equation and solve for $x$.

a) A number is tripled, and 4 is added.
The result is 25.
What is the number?

b)




6) Evaluate.

a) 74 x 50 b) 29 x 900 c) 6704 ÷ 800 d) 2940 ÷ 70

7) Sarah travels to work at an average speed of 44 mph.
Her work is 33 miles from her house.
How long does it take Sarah to travel to her work?

8) Rearrange these so they are in ascending order.

0404 $\frac{1}{4}$ 41% 004 $\frac{4}{10}$

## S2/3 (M) Maths Homework 6

1) To hire a car costs £25 a day and a £40 deposit.
How much does it costs to hire a car for 14 days?

2) Collect like terms:

a) $6x + x$ b) $4y + 3x - y$

c) $12a - 3b + 4a + 3b$ d) $8q + 3p - 12q - p$

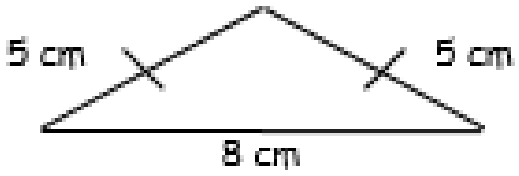
3) For $a = 5$, $b = 8$, $c = 2$ and $d = 3$

a) $6a + 9$ b) $12b - 4d$

c) $2c^2 + 3$ d) $ab$

e) $100 - b^2$ f) $6acd$

4) Find the area of this isosceles triangle.

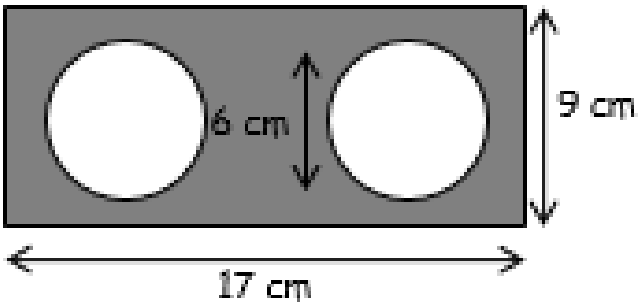



5) Expand and simplify,

a) $4(x + 7) - 3x + 13$ b) $6(a + 3) + a - 7$

c) $3(4s + 5) + 7(3s + 2)$ d) $9(6w + 3) - 7(4s + 1)$

6) Find the area of the shaded shape.




7) Make $n$ the subject of the formula.

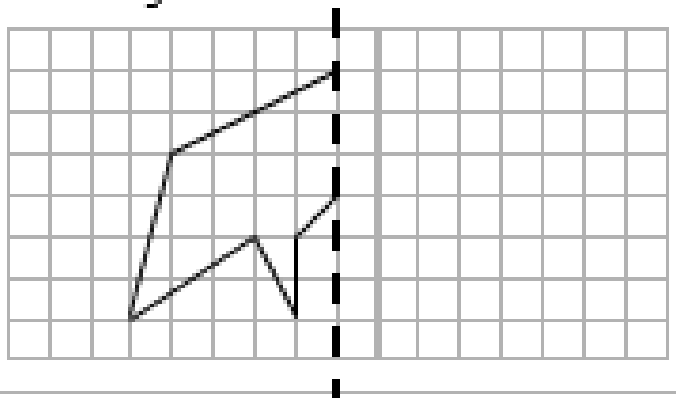
a) $n - 7y = 13$ b) $4m = 9 - n + 4m$

c) $6ya = 2mb$ d) $3 - 5q = a - n$

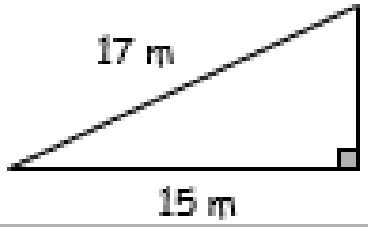
e) $\frac{p}{4} = \frac{n}{2}$ f) $5a^2 = \frac{3nb}{c}$

## S2/3 (M) Maths Homework 7

1) Complete this drawing so that the dotted line is an axis of symmetry.



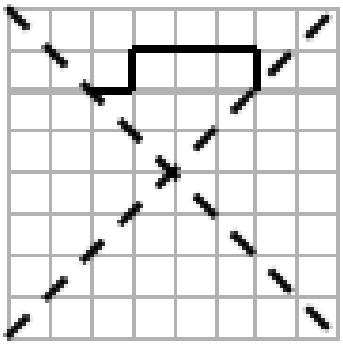
2) Find the area of this shape.




3) Find

a) $74 \div 4$ b) $2396 \div 5$

4) Complete this drawing so that **both** dotted lines are an axes of symmetry.

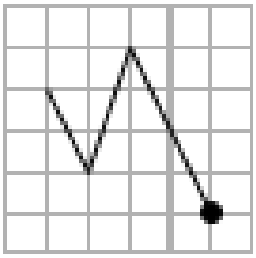


5) Solve,

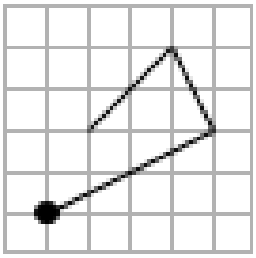
a) $3(x + 5) = 39$ b) $7p + 6 = 3p + 38$

6) Complete these drawings so that they have half turn symmetry about the dot.

a)



b)

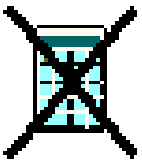


## S2/3 (M) Maths Homework 8

1) Convert these numbers into Scientific Notation.

a) 3000 b) 53 000 c) 874

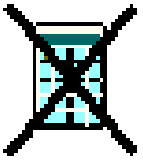
d) 876 000 e) 3 400 000 f) 78



2) Write out these numbers in full.

a) $8{\cdot}3 \times 10^4$ b) $7{\cdot}45 \times 10^3$

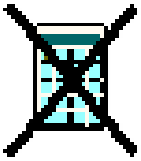
c) $5{\cdot}97 \times 10^5$ d) $2{\cdot}643 \times 10^2$



3) Round 7 674 · 328 to

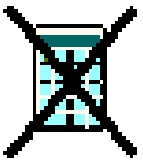
a) the nearest 100 b) the nearest 10

c) one decimal place d) two decimal places



3) Evaluate,

a) $4{\cdot}7895 \times 300$ b) $74{\cdot}3 \div 500$



4) Calculate the average speed of:

a) a car which travels 80km in 2 hours.

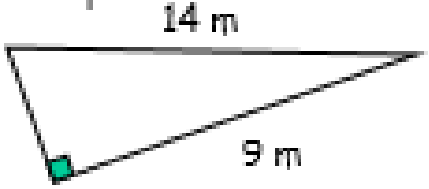
b) a boat which travels 135 miles in 1 hour 30 minutes.

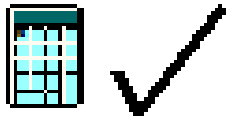
c) a walker who covers 9·2 km in 2 hours 18 minutes.

5) Find the shortest distance between these coordinate points. Give your answers correct to one decimal place.

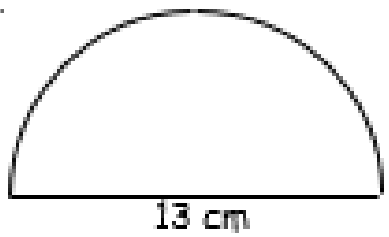
a) (-4, -8) and (3, -2) b) (3, -5) and (-6, 1)

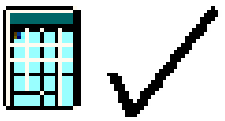
6) Calculate the perimeter of this shape. Give your answer to 2 dp.



7) Find the area of this shape.



## S2/3 (M) Maths Homework 9

1) Write out these numbers in full.

a) $8{\cdot}3 \times 10^4$ b) $7{\cdot}45 \times 10^3$

c) $5{\cdot}97 \times 10^5$ d) $2{\cdot}643 \times 10^2$

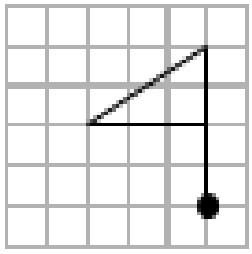
2) Convert these numbers into Scientific Notation.

a) 0·32 b) 0·005 c) 0·078

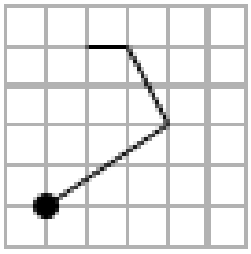
d) 0·000 093 e) 0·000 007 1 f) 0·000 000 07

3) Complete these drawings so that they have quarter turn symmetry about the dot.

a)



b)

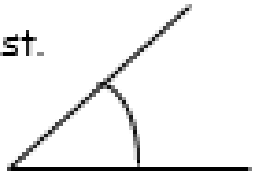


4) Measure the length of this piece of paper.
The teacher will accept an answer of (210 ± 3)mm.

a) What is the highest answer the teacher will accept?

b) What is the lowest answer the teacher will accept?

5) A pupil is asked to measure this angle in a test.



The angle is 42°.
The marking scheme allows (42 ± 2)°.
The pupil says the angle is 44°.
Does the pupil get the mark? Fully explain your answer.

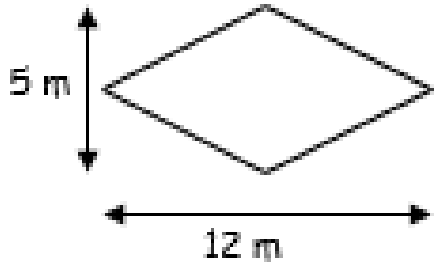
6) Apples on sale at a particular supermarket must have a diameter of between 5 cm and 7 cm.
Write this in tolerance notation.

7) For safety reasons a rivet joint in an aeroplane must be between 19·8 mm and 20·2 mm.
Write this in tolerance notation.

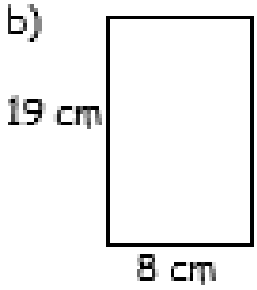
# S2/3 (M) Maths Homework 10

1) Find the area of each of these shapes.

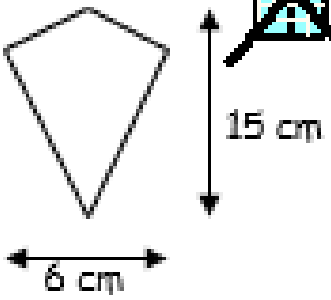
a)



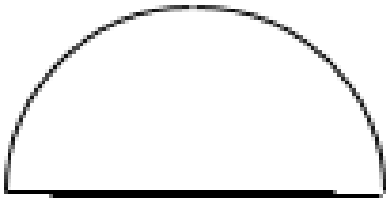

b)



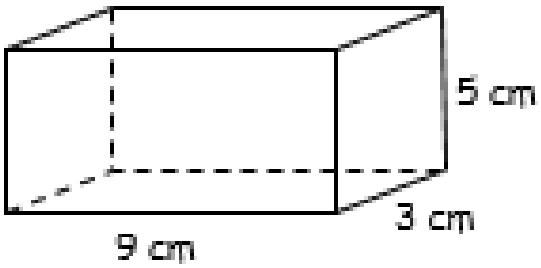

c)




2) Find, a) the area of this shape
b) the perimeter of this shape

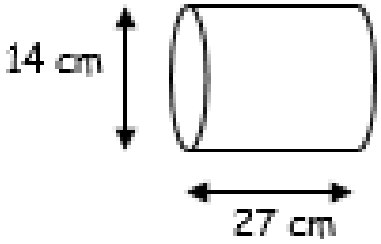



3) Find the surface area of this cuboid.




4) a) Find the curved surface area of this cylinder.

b) Find the total surface area of this cylinder.




5) Find,

a) $\frac{2}{5}$ of £75

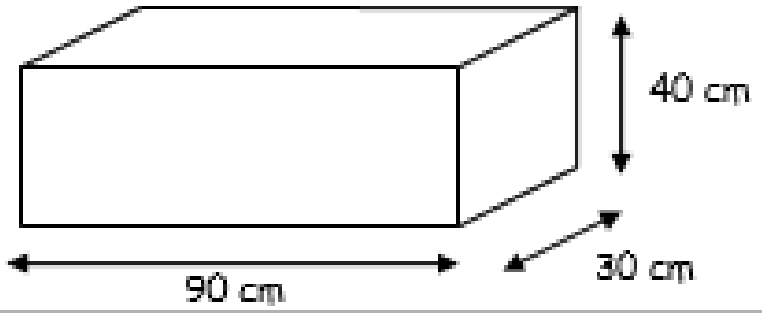
b) $\frac{4}{7}$ of 476 kg

c) 75% of £326

d) 90% of 524 m

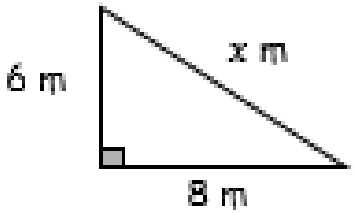
## S2/3 (M) Maths Homework 11

1) Calculate the volume of this cuboid in litres.

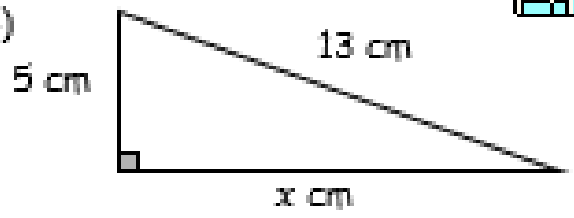



2) Find the length of the unknown side in each of these right angled triangles.

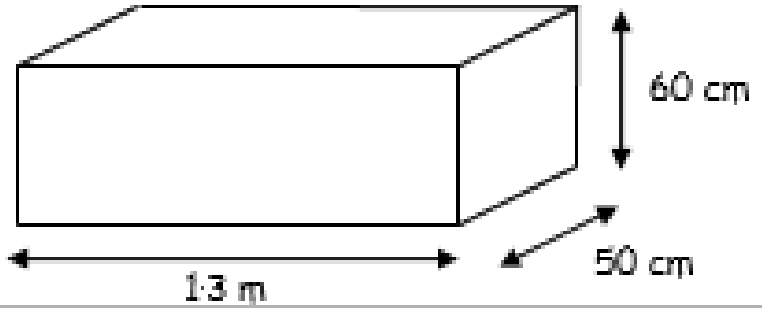
a)




b)




3) Calculate the volume of this cuboid in litres.



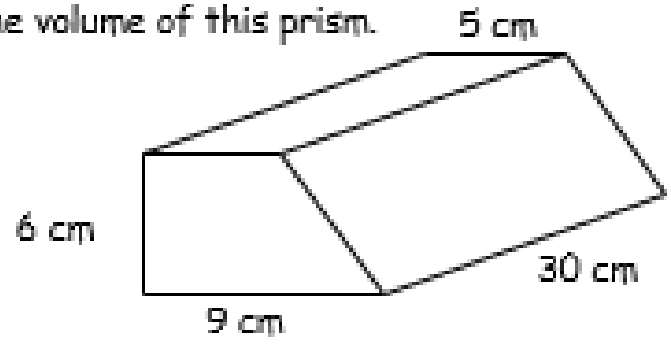

4) A flight to Cape Town from London takes 11 hours. The plane travels at 520 miles per hour. How far is it from London to Cape Town?

5) Mr Harris bought a bicycle for £60. He repaired and and then sold it for £84.

a) Calculate his profit.

b) Calculate his percentage profit.

6) Find the volume of this prism.



## S2/3 (M) Maths Homework 12

1) Expand and simplify,

a) $5(t+3)-3t-8$ b) $6(b-3)-3a+7$

2) Multiply out the brackets and solve.

a) $3(x-2)=12$

b) $4(x+7)=44$

c) $2(x-4)=14$

3) Expand and simplify,

a) $8(x+3)-5x+41$ b) $8(c+5)-c-31$

c) $2(5b+2)+3(7b+4)$ d) $6(7s+9)-8(5s+6)$

4) Factorise the following.

a) $3t+9$ b) $12x^2 - xy^2$

c) $4p-8p^2$ d) $15mn+10m$

e) $4r-12s$ f) $9ab-b^2$

5) Evaluate.

a) $\frac{1}{2}$ of 128 b) $\frac{1}{8}$ of 232 c) $\frac{2}{7}$ of 126 d) $\frac{3}{5}$ of 850

6) A pair of shoes usually costs £96.

They are reduced by a $\frac{1}{3}$ in a sale.

Find the new price of the shoes.

7) A monthly train ticket costs £125.
Fares increase by 10%.
What is the new cost of the monthly train ticket?

8) Find, a) $\frac{1}{4}+\frac{1}{3}$ b) $\frac{5}{8}-\frac{1}{2}$

## S2 (M) Maths Homework 13

1) Round these numbers as each question indicates.

a) 67·845 to 1 d.p. b) 312·206 to 2 d.p.

c) 4·97613 to 2 d.p. d) 5723·6632 to 1 d.p.

2) The ages of the members of a local gym are as follows,

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 27 | 23 | 32 | 37 | 30 | 19 | 35 | 28 | 43 | 38 | 26 |
| 40 | 35 | 32 | 18 | 24 | 24 | 20 | 38 | 32 | 34 | 23 |

Show this data on an ordered stem-and-leaf diagram.

3) a) Find the formula (nth term) of the number series

1, 6, 11, 16, 21, 26,...

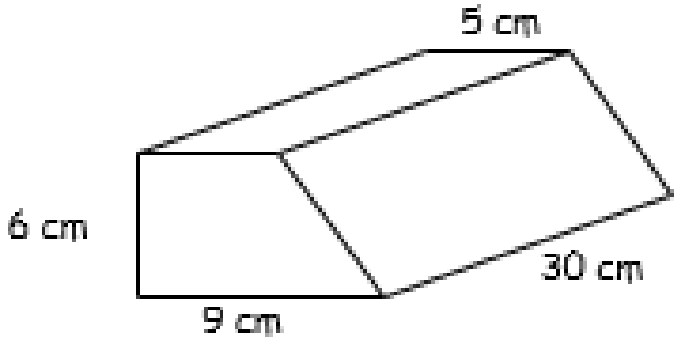
b) What is the 101th term of the series

4) Factorise a) $6g - 42$

b) $8ab + 12b^2$

c) $28k - 14jk$

5) Find the volume of this prism.




6) a) Find a formula that links $y$ to $x$.

| $x$ | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| $y$ | 8 | 11 | 14 | 17 | 20 |

b) Find $y$ if $x = 11$.

c) Find $x$ if $y = 95$.

7) Find 12·5% of £52 192 by only doing one sum.

## S2 (M) Maths Homework 14

1) Change these percentages into decimals and fractions.

a) 21% b) 90% c) 3% d) 24% e) 6%

2) A travel agent decides to reduce the price of all holidays by 32%.
A trip to the Bahamas originally cost £3600.
How much of a discount will you receive?

3) Calculate:

a) a) 75% of £2108 b) $33\frac{1}{3}$% of $2754

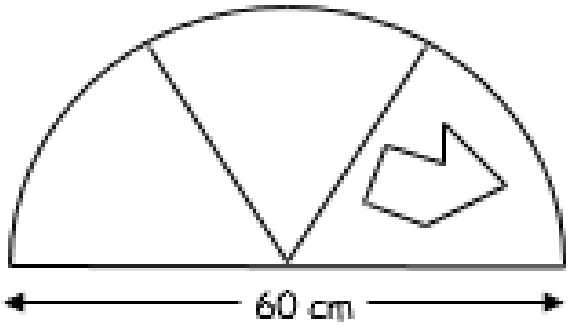
c) 80% of 86p d) 72% of €520

4) Adam earns £18 000 per year.
He receives a 5·4% pay rise.
How much extra will Adam earn now?

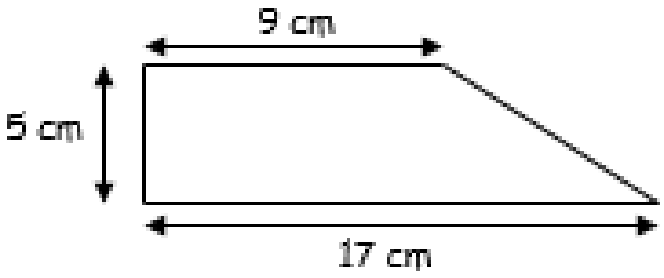
5) Arrange these into ascending order.

a) $\frac{4}{5}$ ,0·77, 81%, $\frac{21}{25}$ b) $\frac{13}{25}$ ,0·49, 53%, $\frac{9}{20}$

6) A window is in the shape of a semi circle with three equal panes of glass.
One of the panes is damaged and needs to be replaced.
Calculate the area of the pane that needs to be replaced.

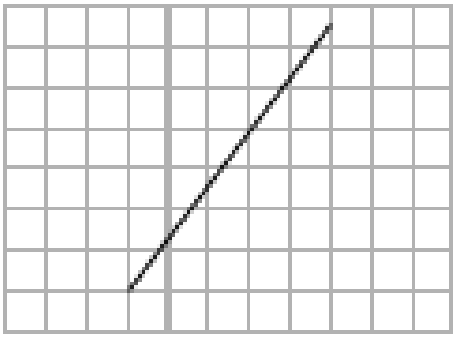


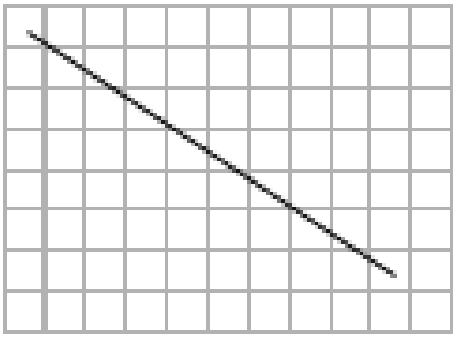

7) Find the area of this shape.



# S2/3 (M) Maths Homework 15

1) Determine the gradient of these lines.

a) 

b) 

2) Solve,

a) $9x - 2 = 160$ b) $4x - 3 = 2x + 13$

c) $7(x - 4) = -14$ d) $3(x - 7) + 7x = 41$

3) If $p = 2$, $q = 3$ and $r = 1$, find the value of:

a) $9p - 4q$ b) $q^2 - 3r$

c) $\dfrac{2p + 2q}{5}$ d) $\dfrac{42}{pqr}$

4) Find,

a) $\frac{2}{5}$ of €75 b) $\frac{4}{7}$ of 476 kg

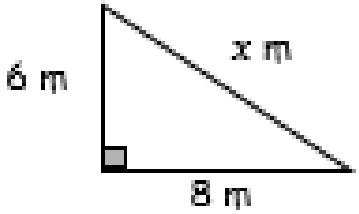
c) 75% of €326 d) 90% of 524 m

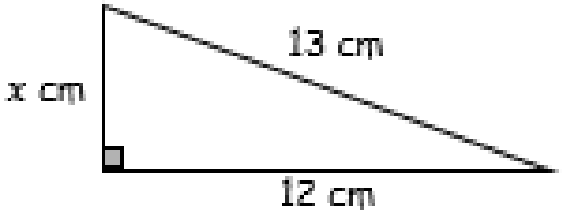
5) Three cream cakes cost €4.14.
How much would 5 cream cakes cost?

6) Evaluate,

a) $4^3 + 2^4$ b) $3^3 - 4^2$

7) Find the length of the unknown side in each of these right angled triangles. Show all working.

a) 


b) 

## S2/3 (M) Maths Homework 16

1)

a) Copy and complete this table for $y = 3x - 1$.

| $x$ | -2 | -1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|
| $y$ | | | | | | |

b) Use the table to draw the straight line $y = 3x - 1$.

2)

a) Sketch these straight lines $y = 3x - 1$ and $y = 2x + 4$ on the same diagram.

b) Use your sketch to determine where the lines cross.

3)

a) Copy and complete this table for $y = \frac{1}{2}x + 4$.

| $x$ | -4 | -2 | 0 | 2 | 4 | 6 |
|---|---|---|---|---|---|---|
| $y$ | | | | | | |

b) Use the table to draw the straight line $y = \frac{1}{2}x + 4$.

4) Kathy sees a necklace for £180.
The jeweller offers her a 5% discount.
Hoe much will Kathy pay?

5) Make neat sketches of the following straight lines.

a) $y = x + 3$ b) $y = 2x - 1$

6) Sketch $y = 2x + 4$ and $y = -x - 2$ on the same coordinate grid.
Where do these lines meet?

7) Solve,

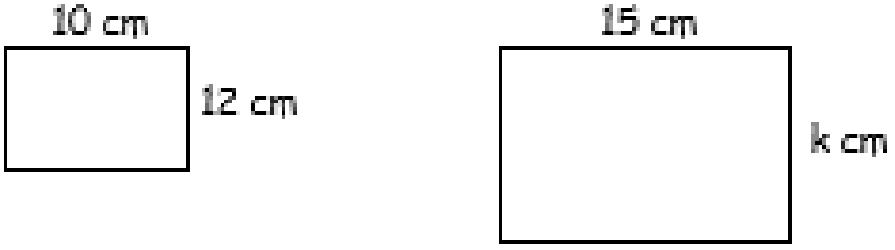
a) $3(x + 5) = 39$ b) $7p + 6 = 3p + 38$

## S2/3 (M) Maths Homework 17

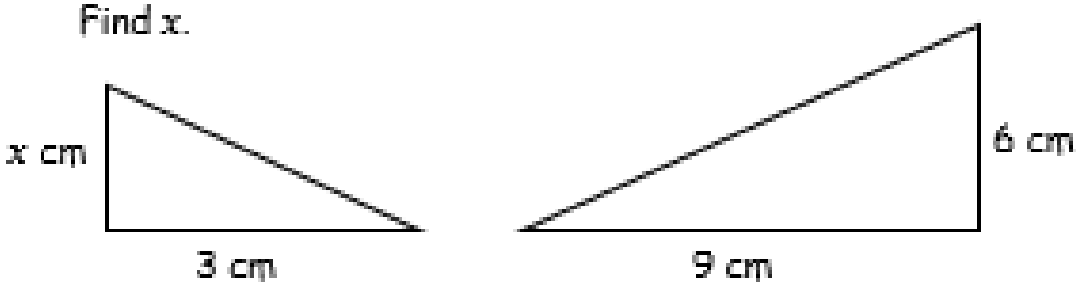
1) Arrange these into ascending order.

a) $\frac{4}{5}$ ,0·77, 81%, $\frac{21}{25}$ b) $\frac{13}{25}$ ,0·49, 53%, $\frac{9}{20}$

2) These are similar rectangles. Find the length of the side marked k cm.




3) These are similar triangles.
Find $x$.




4) Evaluate.

a) $\frac{1}{2}$ of 128 b) $\frac{1}{8}$ of 232 c) $\frac{2}{7}$ of 126 d) $\frac{3}{5}$ of 850

5) Find, a) $\frac{1}{4} + \frac{1}{3}$ b) $\frac{5}{8} - \frac{1}{2}$

6) Find, a) $7\frac{1}{2} + 4\frac{3}{4}$ b) $9\frac{1}{4} - 2\frac{1}{2}$

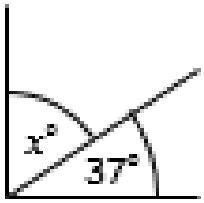
7) Solve,

a) $8x - 3 = 6x + 21$ b) $6y + 5 = 3y + 32$

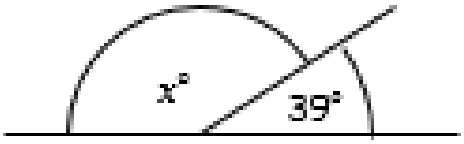
## S2/3 (M) Maths Homework 18

1) Calculate $x°$ in each of these diagrams. Show your working.

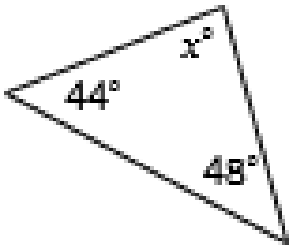
a)



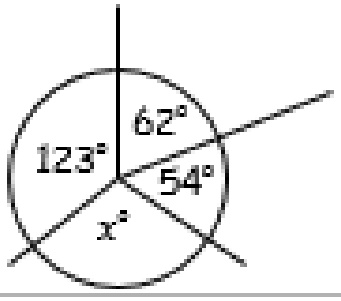

b)



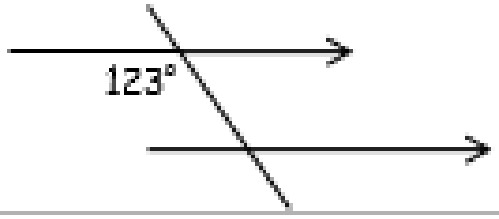

c)




d)

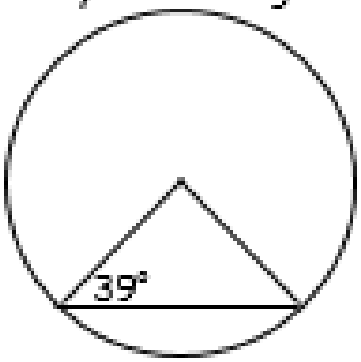



2) COPY the diagram and fill in all the missing angles.

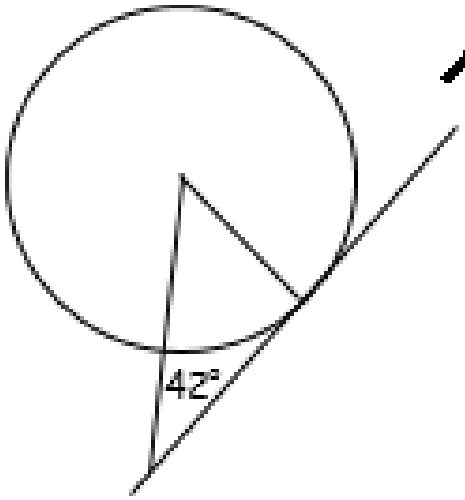



3) Calculate the missing angles in each of these diagrams. Show your working.

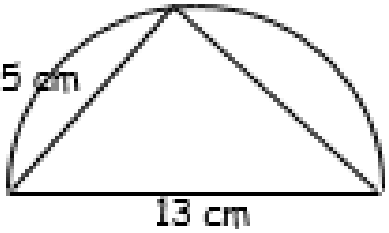
a)




b)



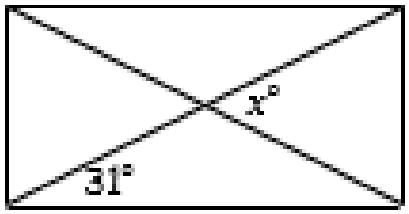

4) Calculate the length of the missing side.



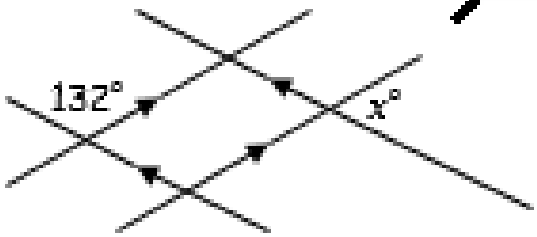
## S2/3 (M) Maths Homework 19

1) Calculate $x°$ in each of these diagrams. Show your working.

a)

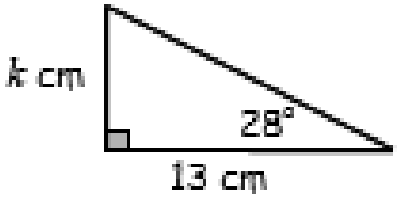



b)

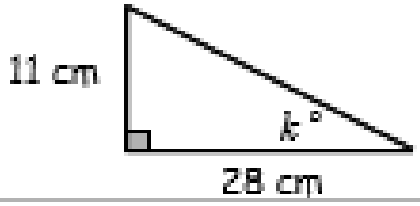



2) Find the length of the side marked $k$ cm.

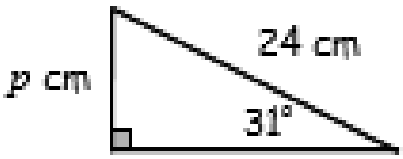
a)



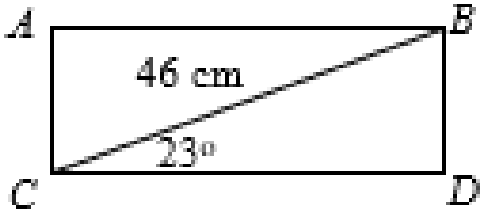

3) Find the size of the angle marked $k°$.




4) Find the length of the side marked $p$ cm.




5)




a) Calculate the length of $BD$.

b) Calculate the length of $AB$.

c) Calculate the area of the rectangle.

6) Find 12·5% of £52 192 by only doing one sum.

# S2/3 (M) Maths Homework 20

1) Gary earns £15 300 in one year.
How much does he earn in one month?

2) Rob works in a car showroom.
He earns £180 a week basic with 4% commission on any sales.
One week Rob reaches £14 000 sales.
How much does Rob earn?

3) Calculate the net pay for this worker.

| | | | | |
|---|---|---|---|---|
| Income | Basic | Overtime | Bonus | Total |
| | £1345·57 | £64·86 | / | |
| Deductions | I. Tax | Superann. | N.I. | Total |
| | £288·36 | £57·24 | £89·16 | |
| | | | NET PAY | |

4) Mr Hughes bought a car for £1500 and then sold it later for £900.

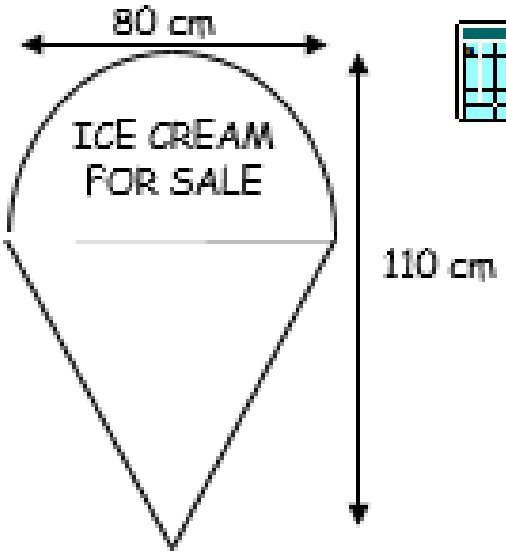
a) Calculate his loss.

b) Calculate his percentage loss.

5) The Davies family to go on holiday to France.
They take £1300 spending money with them.
In France they spend €1700.
They convert their left over Euros back into UK money.
How much money do they receive?
Give your answer to the nearest penny.

£1 = €1·43

6) This sign is made from a semi circle and an isosceles triangle.
Calculate the perimeter of this sign.



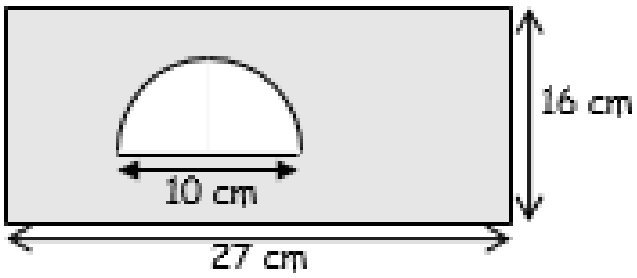
## S2/3 (M) Maths Homework 21

1) It takes a team of six workers 8 hours to paint a wall. How long would this job take if there were only 4 workers ?

2) An adult's ticket for the cinema costs £4·80.
A child's ticket costs £3.
Write the ratio of the cost of a child's ticket : an adult's ticket in it's simplest form.

3) Peter and David have to deliver 150 newspapers.
Peter delivers 40 and David delivers 110.
The newsagent gives them £60.
How much should they get each so that the money is shared fairly?

4) Find the area of the shaded shape.




5) Three cream cakes cost £4·14.
How much would 5 cream cakes cost?

6) Find the shortest distance between these coordinate points. Give your answers correct to one decimal place.

a) (-4, -8) and (3, -2) b) (3, -5) and (-6, 1)

7) Factorise a) $6g - 42$

b) $8ab + 12b^2$

c) $28k - 14jk$

8) Evaluate.

a) $\frac{1}{2}$ of 128 b) $\frac{1}{8}$ of 232 c) $\frac{2}{7}$ of 126 d) $\frac{3}{5}$ of 850