

# GCSE Mathematics

## Practice Tests: Set 6

### Paper 3F (Calculator)

**Time: 1 hour 30 minutes**

You should have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

#### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators may be used.**
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**



#### Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

#### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

**Answer ALL questions.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

1. Here is the menu in Sam's cafe.

Sam's Cafe	
cup of tea	£1.20
cup of coffee	£1.40
breakfast: Sausage, eggs, bacon	£4.10
special: Sausage, eggs, bacon and toast	£4.50

Sameena buys some cups of coffee.  
She only has £10

Work out the greatest number of cups of coffee she can buy.

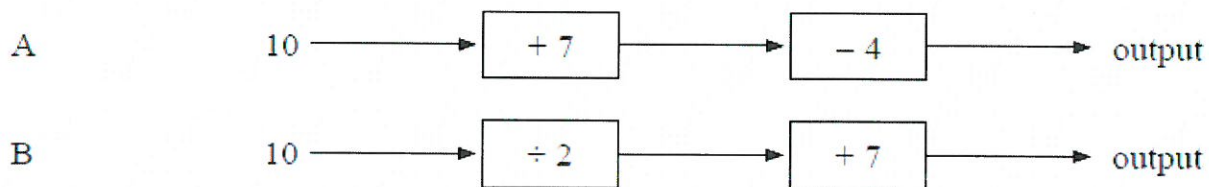
$$\begin{array}{r} 10 \\ \hline 1.4 \end{array} = 7.1$$

.....  
7

**(Total 2 marks)**

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2. (a) Here are two number machines, A and B.



The input for each number machine is 10

Which number machine gives the greater output?  
You must show all your working.

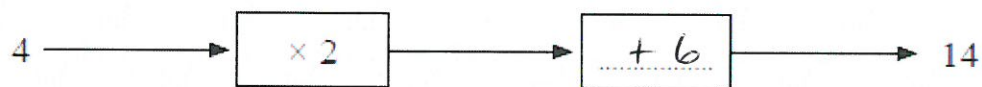
$$A : (10 + 7) - 4 = 13$$

$$B : (10 \div 2) + 7 = 12$$

A .

(3)

Here is a different number machine.



(b) Complete this number machine.

(1)

(Total 4 marks)

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3. Here is a list of numbers.

11    12    13    14    15    16    17    18    19    20

From the list, write down

(a) a factor of 24,

12  
.....  
(1)

(b) a multiple of 7,

14  
.....  
(1)

(c) a square number.

16  
.....  
(1)

**(Total 3 marks)**

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4. Breakfast cereal is put into packets.  
1 kg of the cereal is used to fill 20 packets.

(a) Work out the number of **grams** of cereal in each packet.

$$1 \text{ kg} = 1000 \text{ g}$$

$$\frac{1000}{20} = 50$$

..... 50 g  
(2)

Here are the weights of the ingredients needed to make 100 kg of the cereal.

oats	28 kg
wheat flakes	19 kg
barley flakes	15 kg
fruit	19 kg
nuts	8 kg
seeds	4 kg
other	7 kg

(b) Work out the weight of oats needed to fill 5000 packets of the cereal.  
Give your answer in kg.

1 kg CEREAL FOR 20 PACKETS

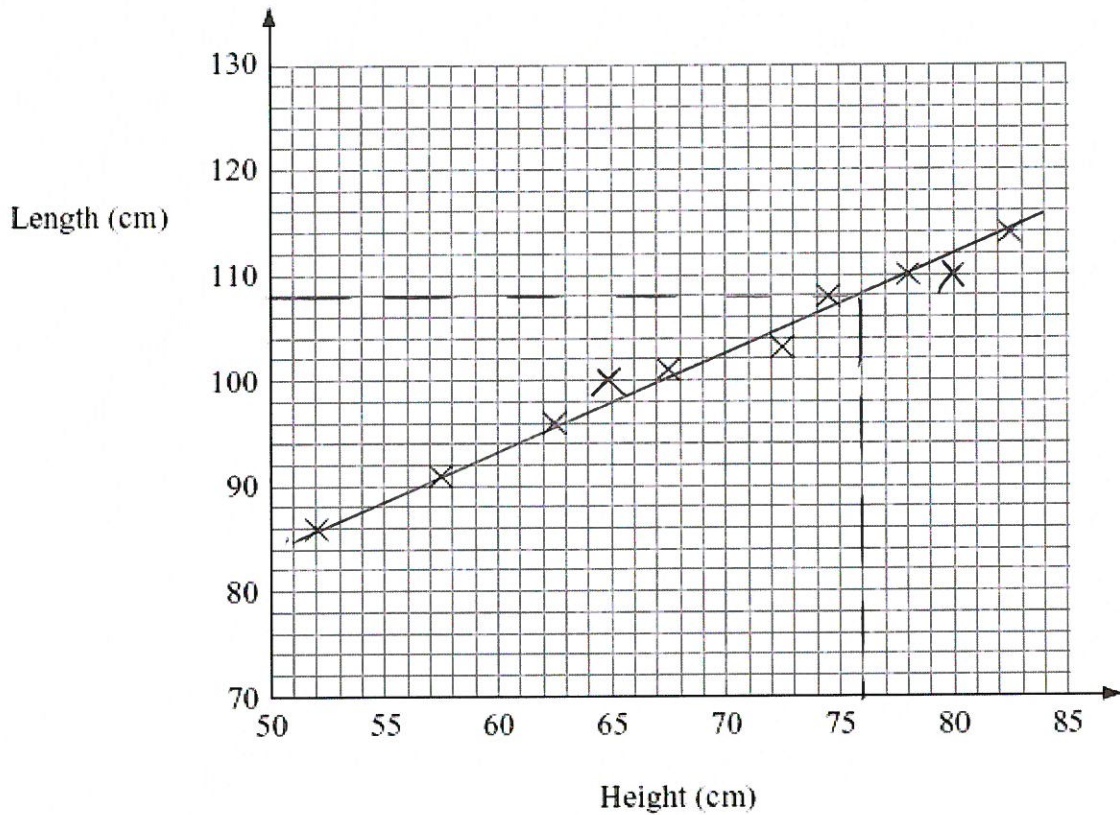
∴ 250 kg CEREAL FOR 5000 <sup>× 250</sup> PACKETS.

$$\therefore \frac{250}{100} \times 28 = 70 \text{ kg.}$$

..... 70 kg  
(3)

(Total 5 marks)

5. The scatter graph shows information about eight sheep. It shows the height and the length of each sheep.



The table gives the height and the length of two more sheep.

Height (cm)	65	80
Length (cm)	100	110

- (a) On the scatter graph, plot the information from the table. (1)
- (b) Describe the relationship between the height and the length of these sheep.

POSITIVE CORRELATION ..... (1)

The height of a sheep is 76 cm.

- (c) Estimate the length of this sheep.

108 .....cm  
(105 - 110) (2)

(Total 4 marks)

6. When you know the length of an adult's foot ( $i$ ) in inches, you can use the formula

$$S = 3i - 25$$

to calculate their UK shoe size ( $S$ ).

When you know an adult's UK shoe size ( $S$ ), you can use the formula

$$E = S + 33$$

to calculate their European shoe size ( $E$ ).

Tamsin is buying some shoes as a present for her friend Jane.  
Jane is an adult with a foot length of 11 inches.

Tamsin orders some shoes.  
The shoes are European size 38

Will the shoes fit Jane?  
You must show all your working.

$$S = 3 \times 11 - 25 = 33 - 25 = 8.$$

$$38 = S + 33$$

$$\therefore S = 5.$$

THE SHOES WILL NOT FIT JANE. SHE REQUIRES  
A UK SIZE = 8 AND THE ONES THAT TAM SIN  
HAS ORDERED ARE SIZE 5.

(Total 3 marks)

7. There are 165 counters in a bag.

Each counter is either black or white.

There are twice as many black counters as white counters in the bag.

Martine takes 40% of the black counters from the bag.

Work out the ratio of the number of black counters to the number of white counters now in the bag.

Give your ratio in its simplest form.

$$\begin{array}{l} B \quad W \\ 2 : 1 \\ 110 : 55 \end{array} \quad \begin{array}{l} 3 \\ 165 \end{array} \quad \begin{array}{l} \swarrow \\ \times 55 \end{array}$$

$$40\% \text{ OF } 110 = \frac{40}{100} \times 110 = 44$$

$$\therefore \text{NUMBER OF BLACK LEFT} = 110 - 44 = 66$$

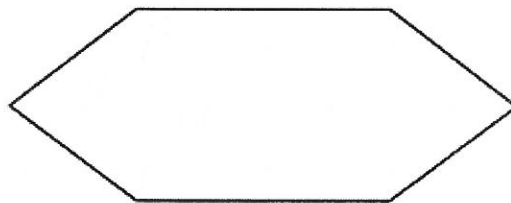
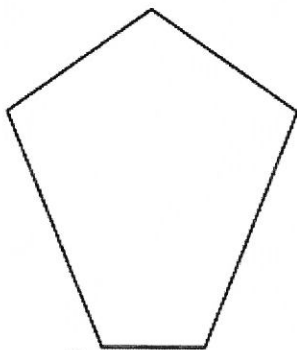
$$\begin{array}{l} \therefore \text{NEW RATIO IS } 66 : 55 \\ = 6 : 5 \end{array}$$

6 : 5

.....  
(Total 4 marks)



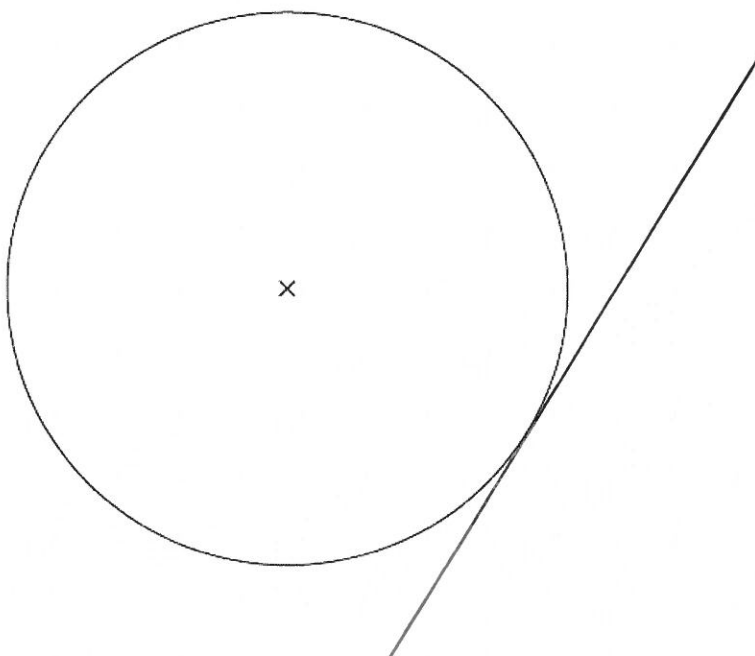
8. (a) Write down the special names of each of these polygons.



(i) ..... PENTAGON ..... (ii) ..... HEXAGON .....

(Total 2 marks)

9. Here is a circle.



The circle has a radius of 4 cm.

(a) Write down the length of the diameter of this circle.

..... 8cm ..... cm  
(1)

(b) On the diagram, draw a tangent to the circle.

(1)

(Total 2 marks)

10. Noah got 8 out of 20 in a test.

Write 8 out of 20 as a percentage.

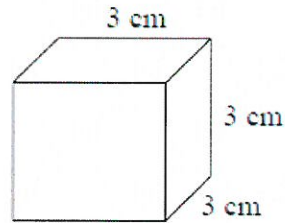
$$\frac{8 \times 5}{20 \times 5} = \frac{40}{100}$$

..... 40 %

**(Total 2 marks)**

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11. Here is a solid cube.



(a) Find the surface area of the cube.

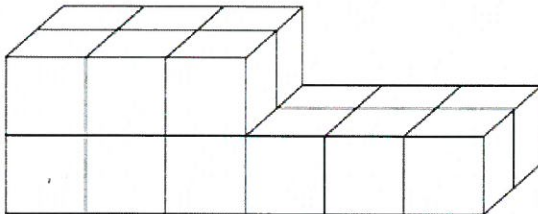
$$3 \times 3 = 9 \text{ cm}^2$$

$$6 \times 9 = 54 \text{ cm}^2$$

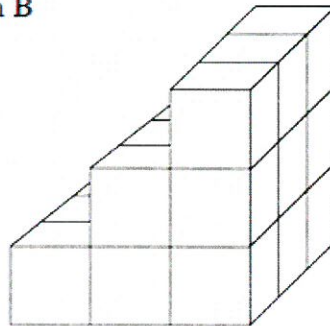
..... 54 .....  $\text{cm}^2$   
(2)

Here are two solid prisms made from centimetre cubes.

prism A



prism B



(b) Compare the volume of prism A with the volume of prism B.

$$A: 6 \times 2 + 3 \times 2 = 12 + 6 = 18 \text{ cm}^3$$

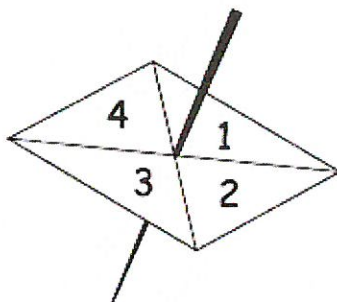
$$B: 3 \times 3 + 2 \times 3 + 1 \times 3 = 9 + 6 + 3 = 18 \text{ cm}^3$$

VOLUMES ARE THE SAME.

(3)

(Total 5 marks)

12. Here is a four-sided spinner.  
The spinner is biased.



The table shows the probabilities that the spinner will land on 1 or on 3

<b>Number</b>	1	2	3	4
<b>Probability</b>	0.2		0.1	

The probability that the spinner will land on 2 is the same as the probability that the spinner will land on 4

- (a) Work out the probability that the spinner will land on 4

$$0.2 + 0.1 = 0.3$$

$$1 - 0.3 = 0.7$$

$$\frac{0.7}{2} = 0.35$$

$$\begin{array}{r} 0.35 \\ \hline \end{array} \quad (3)$$

Shunya is going to spin the spinner 200 times.

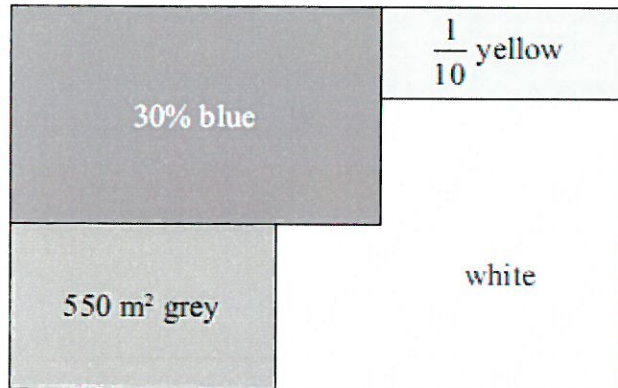
- (b) Work out an estimate for the number of times the spinner will land on 3

$$0.1 \times 200$$

$$\begin{array}{r} 20 \\ \hline \end{array} \quad (2)$$

(Total 5 marks)

13. Here is a shape.



The total area of the shape is 1640 m<sup>2</sup>.

30% of the shape is blue.  $\frac{30}{100} \times 1640 = 492 \text{ m}^2$

$\frac{1}{10}$  of the shape is yellow.  $\frac{1}{10} \times 1640 = 164 \text{ m}^2$

550 m<sup>2</sup> of the shape is grey. The rest of the shape is white.

Is the white area more than 400 m<sup>2</sup>?

$$492 + 164 + 550 = 1206$$

$$1640 - 1206 = 434 \text{ m}^2$$

THE WHITE AREA IS MORE THAN 400m<sup>2</sup>. IT IS 434m<sup>2</sup>.

(Total 5 marks)

14.

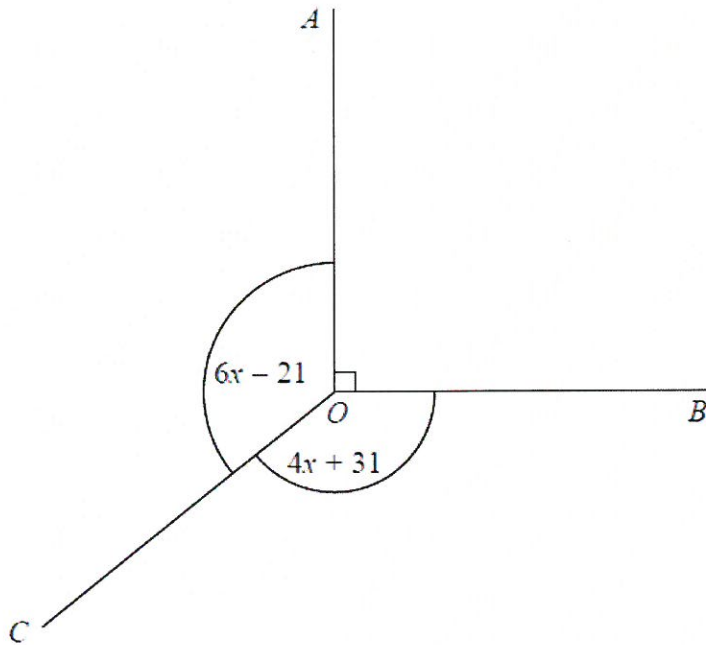


Diagram NOT  
accurately drawn

In the diagram, all angles are in degrees.

Angle  $AOB$  is a right angle.

Angle  $AOC =$  Angle  $BOC$ .

Work out the value of  $x$ .

$$6x - 21 + 90 + 4x + 31 = 360$$

$$10x + 100 = 360$$

$$\therefore 10x = 260$$

$$\therefore x = 26$$

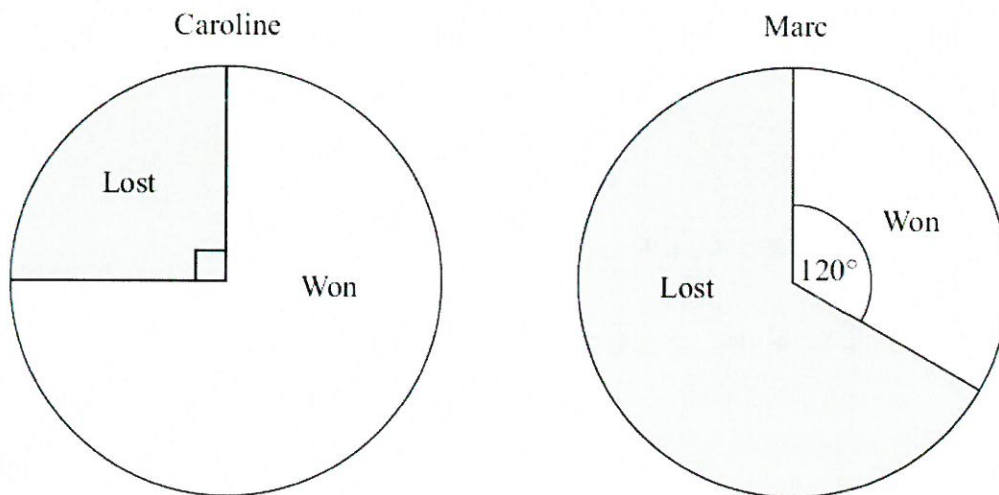
.....  
 $26^\circ$

(Total 3 marks)

15. Caroline and Marc are in a darts team.

The pie charts show information about the number of games Caroline and Marc each won last year.

They also show information about the number of games Caroline and Marc each lost last year.



Caroline played 52 games.  
Marc played 150 games.

Marc won more games than Caroline.

How many more?

$$\text{CAROLINE WON } \frac{3}{4} \times 52 = 39$$

$$\text{MARC WON } \frac{1}{3} \times 150 = 50$$

$$50 - 39 = 11$$

11

(Total 3 marks)

16. Anna is making crumble.

She makes the crumble from flour, sugar and butter.  
Anna needs twice as much butter as sugar.  
She needs one and a half times as much flour as butter.

Anna is going to make 900 g of crumble.

Calculate the amount of sugar Anna needs.

SUGAR  $x$

BUTTER  $2x$

FLOUR  $1.5 \times 2x = 3x$

$$\therefore 3x + 2x + x = 6x = 900$$

$$\therefore x = 150$$

.....150.....g

(Total 4 marks)



17. Toby invested £4500 for 2 years in a savings account.  
He was paid 4% per annum compound interest.

How much did Toby have in his savings account after 2 years?

$$1.04^2 \times 4500$$

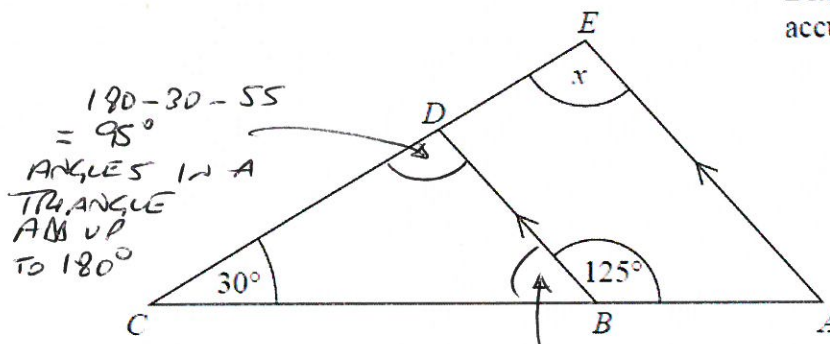
£ 4867.20

(Total 3 marks)

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18.

Diagram NOT  
accurately drawn



$ABC$  and  $EDC$  are straight lines.  
 $AE$  and  $BD$  are parallel.  
Angle  $ABD = 125^\circ$   
Angle  $BCD = 30^\circ$

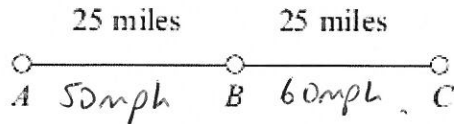
$180 - 125 = 55^\circ$   
ANGLES ON A STRAIGHT  
LINE ADD UP TO  $180^\circ$

Work out the size of the angle marked  $x$ .  
Give reasons for your answer.

$x = 95^\circ$  BECAUSE  $x = \hat{CDE}$  CORRESPONDING ANGLES ARE EQUAL

(Total 4 marks)

19.



$A$ ,  $B$  and  $C$  are 3 service stations on a motorway.

$$AB = 25 \text{ miles}$$

$$BC = 25 \text{ miles}$$

Aysha drives along the motorway from  $A$  to  $C$ .

Aysha drives at an average speed of 50 mph from  $A$  to  $B$ .

She drives at an average speed of 60 mph from  $B$  to  $C$ .

Work out the difference in the time Aysha takes to drive from  $A$  to  $B$  and the time Aysha takes to drive from  $B$  to  $C$ .

Give your answer in minutes.

$$AB : \text{TIME} = \frac{25}{50} = \frac{1}{2} \text{ HR} = 30 \text{ MINS.}$$

$$BC : \text{TIME} = \frac{25}{60} \text{ HRS} = \frac{25}{60} \times 60 = 25 \text{ MINS.}$$

$$30 - 25 = 5$$

..... 5 ..... minutes

(Total 3 marks)

20. Solve the simultaneous equations

$$2x - y = 13 \quad \times 2$$

$$x - 2y = 11$$

$$4x - 2y = 26$$

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$$3x = 15$$

$$x = 5$$

$$2 \times 5 - y = 13$$

$$10 - y = 13$$

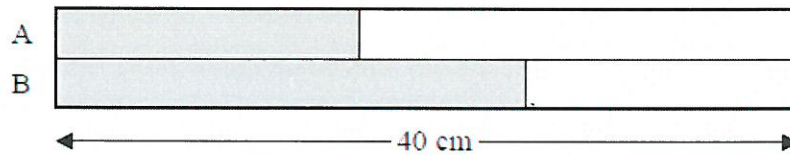
$$y = -3$$

$$x = \underline{5}$$

$$y = \underline{-3}$$

(Total 3 marks)

21. Here is a rectangle.



The rectangle has been divided into two strips, A and B.  
The strips have the same width.

$\frac{2}{5}$  of strip A is shaded.  $\therefore \frac{3}{5}$  NOT SHADED  $\frac{3}{5} \times 40 = 24 \text{ cm}$ .

$\frac{5}{8}$  of strip B is shaded.  $\therefore \frac{3}{8}$  NOT SHADED  $\frac{3}{8} \times 40 = 15 \text{ cm}$ .

The length of the rectangle is 40 cm.

What fraction of the rectangle is **not** shaded?

$$24 + 15 = 39$$

$$40 + 40 = 80$$

$$\frac{39}{80}$$

(Total 4 marks)

22. Make  $w$  the subject of the formula  $P = \frac{w-3}{2}$

$$2P = w - 3$$

$$2P + 3 = w$$

$$w = 2P + 3$$

(Total 2 marks)

23. (a) Simplify fully  $\frac{n^7 \times n^3}{n^6}$

$$\frac{n^4}{\dots\dots\dots} \quad (2)$$

(b) Factorise  $5y - 15$

$$\frac{5(y - 3)}{\dots\dots\dots} \quad (1)$$

(c) Factorise fully  $18ab + 27ab^2$

$$\frac{9ab(2 + 3b)}{\dots\dots\dots} \quad (2)$$

(Total 7 marks)

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**TOTAL FOR PAPER IS 80 MARKS**