

2

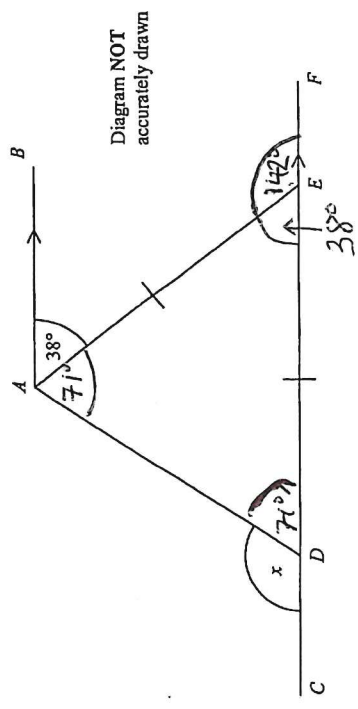


Diagram NOT accurately drawn

The diagram shows a parallelogram.
The sizes of the angles, in degrees, are

- $2x$
- $3x - 15$
- $2x$
- $2x + 24$

Work out the value of x .

$$3x - 15 + 2x + 2x + 2x + 24 = 360^\circ$$

$$9x + 9 = 360$$

$$9x = 351$$

$$x = 39$$

$x =$

(Total for Question 11 is 3 marks)

12



P 4 0 6 4 5 A 0 1 2 2 8

1

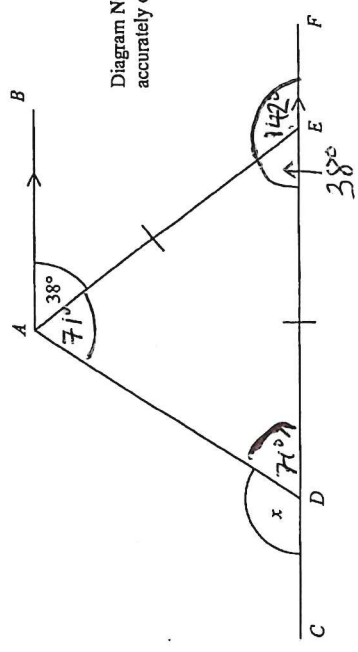


Diagram NOT accurately drawn

$CDEF$ is a straight line.
 AB is parallel to CF .
 $DE = AE$.

Work out the size of the angle marked x .
You must give reasons for your answer.

Co-interior angles = 180°
angles on a straight line = 180°

$$180 - 38 = 142^\circ \div 2 = 71$$

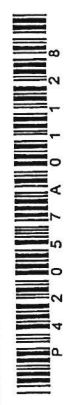
Base angles on an isosceles are equal

$$180 - 71 = 109^\circ$$

$$x = 109^\circ$$

(Total for Question 10 is 4 marks)

11



P 4 2 0 5 7 A 0 1 1 2 8

Turn over

3

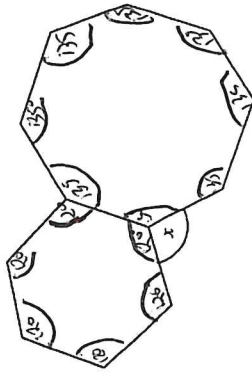


Diagram NOT
accurately drawn

The diagram shows a regular hexagon and a regular octagon.

Calculate the size of the angle marked x .
You must show all your working.

$$\text{Exterior angle} = \frac{360}{n} \leftarrow \text{number of sides}$$

Hexagon = 6 sides. Octagon = 8 sides

$$\frac{360}{6} = 60^\circ \quad \frac{360}{8} = 45^\circ$$

$$60^\circ + 45^\circ$$

$$x = 105^\circ$$

(Total for Question 13 is 4 marks)



P 4 0 6 4 5 A 0 1 4 2 8

4

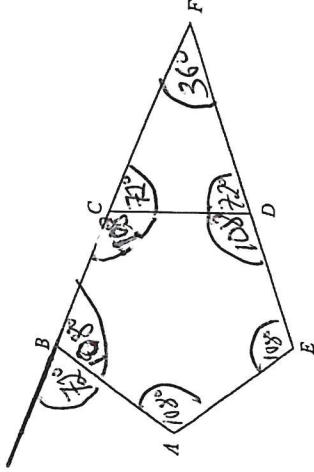


Diagram NOT
accurately drawn

$ABCDE$ is a regular pentagon.
 BCF and EDF are straight lines.

Work out the size of angle CFD .
You must show how you got your answer.

$$\text{Pentagon} = 5 \text{ sides}$$

$$\frac{360}{5} = 72^\circ = \text{exterior angle}$$

$$180^\circ - 72^\circ = 108^\circ \text{ interior angle}$$

Angles on a straight line add up to 180°

$$180^\circ - 72^\circ - 72^\circ = 36^\circ$$

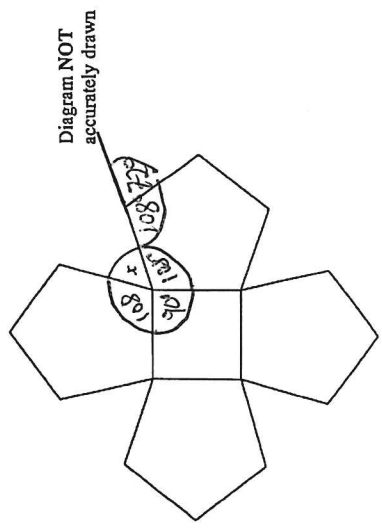
Angles in a triangle add up to 180°

(Total for Question 11 is 3 marks)



P 4 4 0 2 2 A 0 1 3 2 8

3



The diagram shows a square and 4 regular pentagons.
Work out the size of the angle marked x .

$$360 \div 5 = 72^\circ = \text{exterior}$$

$$180 - 72 = 108^\circ = \text{interior}$$

$$360 - 108 - 90 - 108 = 54^\circ$$

$$x = 54^\circ$$

(Total for Question 13 is 3 marks)



5 Write 525 as a product of its prime factors.

$$3 \times 5^2 \times 7$$

(Total for Question 5 is 3 marks)

Ed has 4 cards.
There is a number on each card.

12

6

15

?

The mean of the 4 numbers on Ed's cards is 10

Work out the number on the 4th card.

$$\frac{x}{4} = 10 \Rightarrow x = 40$$

$$12 + 6 + 15 + ? = 40$$

$$33 + 7 = 40$$

$$7$$

(Total for Question 6 is 3 marks)



10 Here is the number of goals scored by a football team in each of its first 10 games.

3 1 4 2 0 1 1 1 3 2

(a) Write down the mode.

4

(b) Work out the mean number of goals for the first 10 games.

1.8

In the 11th game the team scored 4 goals.
In the 12th game the team scored 2 goals.

*(c) Will the mean number of goals for the 12 games be greater than or less than the mean number of goals for the first 10 games?
You must explain your answer.

The mean for 12 games = $24 \div 12$
= 2

so it will be greater.

(Total for Question 10 is 5 marks)



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.

400×0.3

120

(Total for Question 12 is 2 marks)

11 Bob asked each of 40 friends how many minutes they took to get to work.

The table shows some information about his results.

Time taken (m minutes)	Frequency	MV	F.MV
$0 < m \leq 10$	3	5	15
$10 < m \leq 20$	8	15	120
$20 < m \leq 30$	11	25	275
$30 < m \leq 40$	9	35	315
$40 < m \leq 50$	9	45	405

Work out an estimate for the mean time taken.

1130

$1130 \div 40$

=

28.25

minutes

(Total for Question 13 is 4 marks)



14 The table gives information about the temperature, $T^{\circ}\text{C}$, at noon in a town for 50 days.

Temperature ($T^{\circ}\text{C}$)	Frequency	MV	F.M.V
$8 < T \leq 12$	6	10	60
$12 < T \leq 16$	8	14	112
$16 < T \leq 20$	13	18	234
$20 < T \leq 24$	21	22	462
$24 < T \leq 28$	2	26	52

(a) Write down the modal class interval.

$$20 < T \leq 24$$

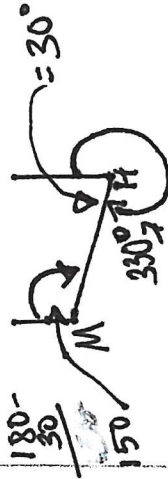
(b) Calculate an estimate for the mean temperature.

$$920 \div 50$$

$$18.4^{\circ}\text{C}$$

11 Manchester airport is on a bearing of 330° from a London airport.

(a) Find the bearing of the London airport from Manchester airport.



The London airport is 200 miles from Manchester airport.

A plane leaves Manchester airport at 10am to fly to the London airport.
The plane flies at an average speed of 120mph.

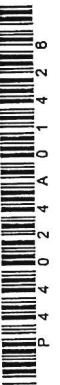
(b) What time does the plane arrive at the London airport?

$$S = \frac{D}{T} \quad 30 \quad T = \frac{D}{S}$$

$$\frac{200}{120} = \frac{200}{120} \times 60 = 100 \text{ mins}$$

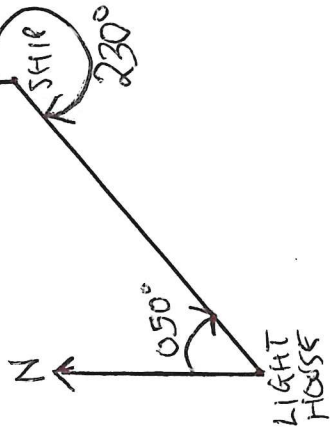
$$1 \text{ hr } 40 \text{ min}$$

(Total for Question 11 is 6 marks)



13 The bearing of a ship from a lighthouse is 050° .

Work out the bearing of the lighthouse from the ship.



$$\text{QUICK METHOD} = 050 + 180 = 230^\circ$$

230

(Total for Question 14 is 2 marks)

14 (a) Simplify $m^2 + m^2$

m^2

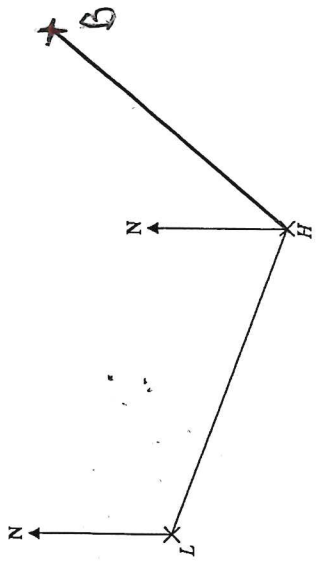
(b) Simplify $5x^2y^3 \times x^2y$

$5x^4y^4$

(Total for Question 15 is 3 marks)



14 The diagram shows the position of a lighthouse L and a harbour H .



The scale of the diagram is 1 cm represents 5 km.

(a) Work out the real distance between L and H .
 $\approx 4.4 \text{ cm} \times 5$

22 km

(b) Measure the bearing of H from L .

110

A boat B is 20 km from H on a bearing of 040° .

(c) On the diagram, mark the position of boat B with a cross (x). Label it B .

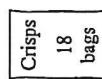
(Total for Question 14 is 4 marks)



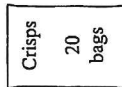
A shop sells bags of crisps in different size packs.

There are

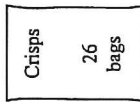
- 18 bags of crisps in a small pack
- 20 bags of crisps in a medium pack
- 26 bags of crisps in a large pack



£4 each pack



£4.99 each pack



£6.00 each pack

Which size pack is the best value for money?
You must show all your working.

$$£4.00 \div 18$$

$$= 0.2$$

$$£4.99 \div 20$$

$$0.2495$$

$$£6.00 \div 26$$

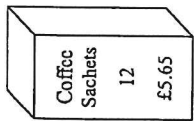
$$0.23$$

18 bags is the best value.

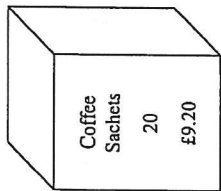
(Total for Question 4 is 4 marks)



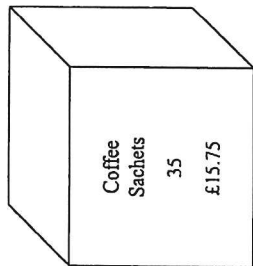
6 Coffee sachets are sold in three different sizes of box.



small



medium



large

A small box has 12 coffee sachets and costs £5.65

A medium box has 20 coffee sachets and costs £9.20

A large box has 35 coffee sachets and costs £15.75

Work out which size of box gives the best value for money.
You must show all your working.

$$5.65 \div 12 = 0.47$$

$$9.20 \div 20 = 0.46$$

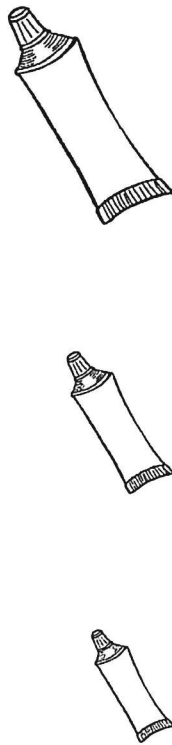
$$15.75 \div 35 = 0.45$$

35 coffee sachet is the best value.

(Total for Question 6 is 4 marks)



8. Toothpaste is sold in three different sizes of tube.



125 ml

75 ml

50 ml

A 50 ml tube costs £1.09

A 75 ml tube costs £1.68

A 125 ml tube costs £2.69

Which tube of toothpaste is the best value for money?
You must show all your working.

$$\begin{aligned} 1.09 \div 50 &= 0.0218 \\ 1.68 \div 75 &= 0.0224 \\ 2.69 \div 125 &= 0.02152 \end{aligned}$$

125 ml tube is the best value.

(Total for Question 8 is 4 marks)

12. The diagram shows a circle drawn inside a square.

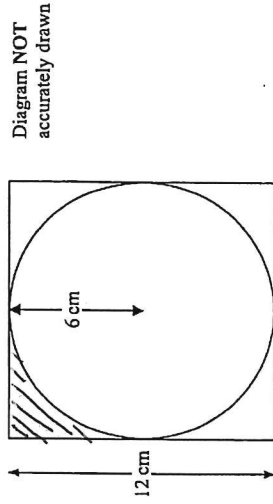


Diagram NOT
accurately drawn

The circle has a radius of 6 cm.
The square has a side of length 12 cm.

Work out the shaded area.

Give your answer in terms of π .

← so leave π in your answer

$$\text{Area of square } 12 \times 12 = 144 \text{ cm}^2$$

$$\begin{aligned} \text{Area of circle} &= \pi r^2 \\ &= \pi \times 6^2 \end{aligned}$$

Area of shaded section

$$144 - 36\pi = 36 - 9\pi$$

$$36 - 9\pi \text{ cm}^2$$

(Total for Question 12 is 3 marks)

But this is a calculator paper
so answer 7.73 cm²



Turn over



13
Turn over

20

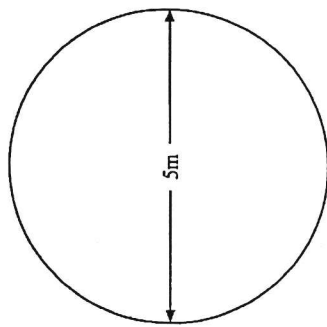


Diagram NOT
accurately drawn

Jon has a flower garden in the shape of a circle.

The diameter of the garden is 5 metres.

Jon wants to put fencing around the edge of the garden.

The fencing costs £1.80 per metre.

Work out the total cost of the fencing.

$$\pi \times D = \pi \times 5 = 15.70796327$$

$$£1.80 \times 15.70796327 =$$

$$£28.27$$

£28.27

(Total for Question 5 is 3 marks)



P 4 2 0 5 9 A 0 7 2 8

7

Turn over >

11 The diagram shows the top of Levi's birthday cake.

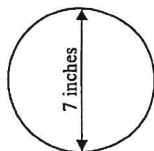


Diagram NOT
accurately drawn

The top of the cake is in the shape of a circle.

The diameter of the circle is 7 inches.

A ribbon is going to be put around the side of the cake.

Ribbons are sold in 50 cm lengths.

1 inch is 2.54 cm.

Work out if one length of ribbon is long enough to go all the way around the cake.

You must show your working.

$$C = \pi D$$

$$C = \pi \times 7$$

$$C = 21.99114858$$

$$= 21.99 \times 2.54 \text{ (convert to cm)}$$

$$= 55.86$$

The ribbon is not long enough

(Total for Question 11 is 4 marks)



P 4 5 8 7 2 A 0 1 1 2 8

11

Turn over

23

Saphia is organising a conference.
People at the conference will sit at circular tables.

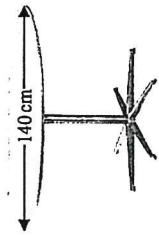


Diagram NOT accurately drawn

Each table has a diameter of 140 cm.
Each person needs 60 cm around the circumference of the table.

There are 12 of these tables in the conference room.
A total of 90 people will be at the conference.

Are there enough tables in the conference room?

$$\text{Circumference} = \pi \times D$$

$$H \times 140 = 439.8229715$$

$$\div 60 = 7.3303 \dots$$

So that's 7 people per table

$$7 \times 12 = 84$$

Only enough room for 84

NOT 90.

(Total for Question 11 is 4 marks)



23

John travelled 30 km in 1.5 hours.
Kamala travelled 42 km in 2 hours.

Who had the greater average speed?
You must show your working.

$$S = \frac{D}{T}$$

$$\text{John: } S = \frac{30}{1.5} = 20 \text{ km/h}$$

$$\text{Kamala: } S = \frac{42}{2} = 21 \text{ km/h}$$

Kamala
(Total 3 marks)

24

The mass of 5 m³ of copper is 44 800 kg.

(a) Work out the density of copper.



$$D = \frac{M}{V}$$

$$\frac{44800}{5}$$

$$8960 \text{ kg/m}^3$$

(2)

The density of zinc is 7130 kg/m^3 .

(b) Work out the mass of 5 m^3 of zinc.

$$D = \frac{M}{V}$$

$$\text{So } M = D \times V$$

$$= 7130 \times 5$$

$$= 35650 \text{ kg}$$

(2)
(Total 4 marks)

A silver chain has a volume of 5 cm^3 .
The density of silver is $10.5 \text{ grams per cm}^3$.

Work out the mass of the silver chain.

$$D = \frac{M}{V}$$

$$\text{So, mass} = D \times V$$

$$= 10.5 \times 5$$

$$= 52.5 \text{ grams}$$

(Total 2 marks)

15 (a) Work out the value of 25^{-3}

$$\frac{1}{15625}$$

(b) Work out the value of 350^3
Give your answer in standard form.

$$42875000$$

$$4.2875 \times 10^7$$

(Total for Question 15 is 3 marks)

Liquid A has a density of 0.7 g/cm^3 .
Liquid B has a density of 1.6 g/cm^3 .

140 g of liquid A and 128 g of liquid B are mixed to make liquid C.

Work out the density of liquid C.

$$(A) \text{ Volume} = \frac{140}{0.7} = 200 \text{ cm}^3$$

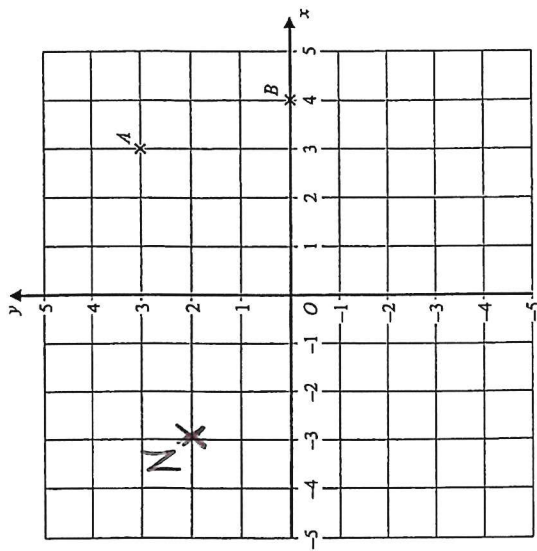
$$(B) \text{ Volume} = \frac{128}{1.6} = 80 \text{ cm}^3$$

$$\text{Density of C} = \frac{140 + 128}{200 + 80} = \frac{268}{280} = 0.95714286 \text{ g/cm}^3$$

$$0.957$$

(Total for Question 16 is 4 marks)





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

3 3
(.....,)

(1)

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

4 0
(.....,)

(1)

N is the point (-3, 2)

(c) On the grid, mark the point N with a cross (x). Label it N.

(1)

M is another point.

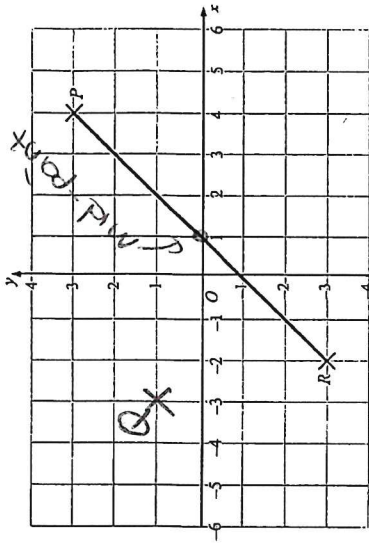
The x coordinate of M is the same as the x coordinate of N. (-3)
The y coordinate of M is the same as the y coordinate of B. (0)

(d) Write down the coordinates of the point M.

-3 0
(.....,)

(1)

(Total 4 marks)



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

4 3
(.....,)

(1)

(b) On the grid, mark the point (-3, 1) with a cross (x). Label the point Q.

(1)

(c) Write down the coordinates of the midpoint of the line PR.

1 0
(.....,)

(2)

(Total 4 marks)

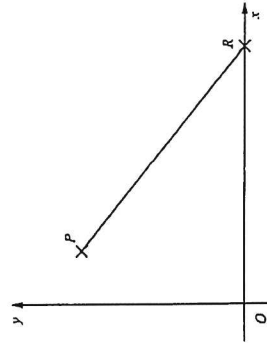


Diagram NOT accurately drawn

P has coordinates (1, 4)

R has coordinates (5, 0)

Find the coordinates of the mid-point of the line PR.

midpoint
 $\frac{1+5}{2}$
 $\frac{4+0}{2}$

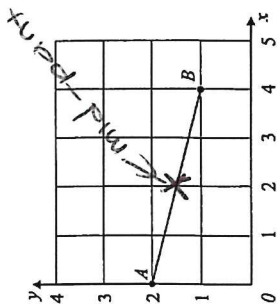
(2)

(3)

3 2
(.....,)

(Total 2 marks)

33



(a) Write down the coordinates of the point

(i) A,

(0, 2)

(ii) B.

(4, 1)

(2)

(b) On the grid, mark with a cross (x) the midpoint of the line AB.

(1)
(Total 3 marks)

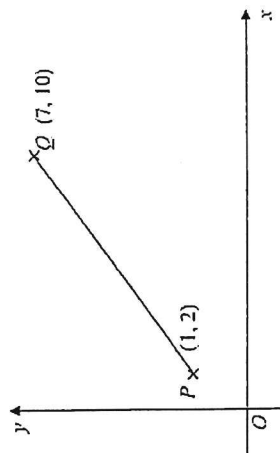


Diagram NOT accurately drawn

P has coordinates (1, 2)

Q has coordinates (7, 10)

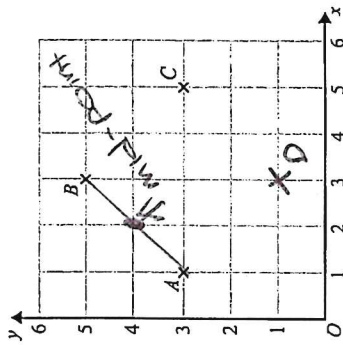
Find the coordinates of the mid-point of the line PQ.

Middle x
1 + 7
2 + 10
2 2

(4, 6)
(Total 2 marks)

(6)

(4)



(a) Write down the coordinates of point C.

(5, 3)

(b) Write down the coordinates of the midpoint of AB.

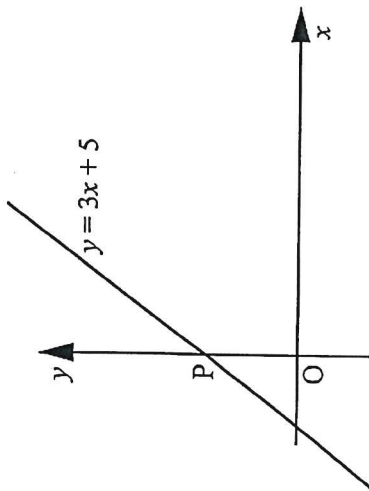
(2, 4)

(c) On the grid, mark with a cross (x) the point D so that ABCD is a square. Label this point D.

(Total for Question 8 is 3 marks)



34



- (a) The line $y = 3x + 5$ crosses the y axis at P.
What is the value of y at P?

5 (1)

- (b) Write down the equation of another line which
is parallel to $y = 3x + 5$

$$y = 3x + 6 \quad (1)$$

35

- A line passes through the point $(0, 4)$.
The gradient of this line is 2.
Write down the equation of this line.

$$y = 2x + 4 \quad (2)$$

36

- A straight line has equation $y = 5 - 3x$
(a) Write down the gradient of the line.

-3 (1)

- (b) Write down the coordinates of the point where the line
crosses the y axis.

(0, 5) (1)

37

- A straight line has equation $y = 3x - 2$
(a) Write down the gradient of the line.

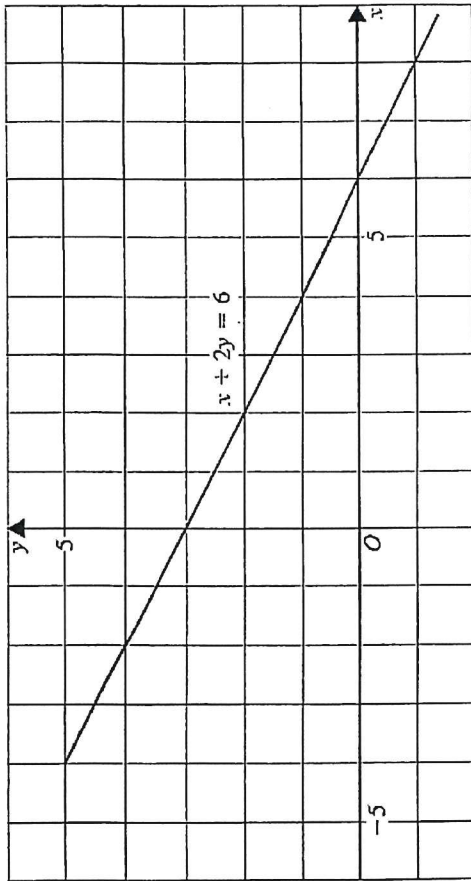
3 (1)

- (b) Write down the coordinates of the point where the line
crosses the y axis.

(0, -2) (1)

33

The line with equation $x + 2y = 6$ has been drawn on the grid.



(a) Rearrange the equation $x + 2y = 6$ to make y the subject.

$$\begin{aligned} 2y &= 6 - x \\ y &= \frac{6 - x}{2} \end{aligned}$$

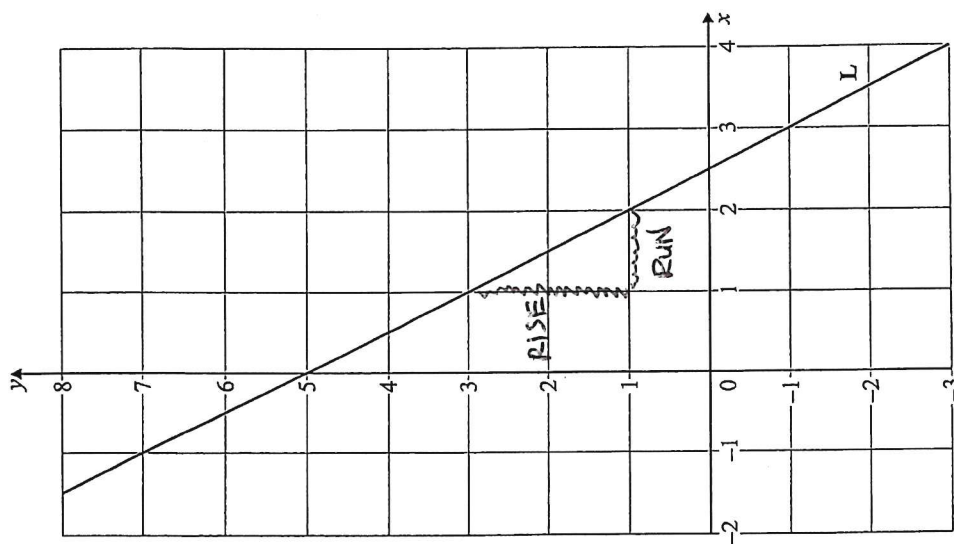
..... (2)

(b) Write down the gradient of the line with equation $x + 2y = 6$

$$-\frac{1}{2} \dots (2)$$

(c) Write down the equation of the line which is parallel to the line with equation $x + 2y = 6$ and passes through the point with coordinates $(0, 7)$.

$$x + 2y = 7 \dots (1)$$



Find the equation of line L

$$\frac{\text{Rise}}{\text{Run}} = \frac{2}{1} = 2$$

$$y\text{-intercept} = 5$$

$$y = -\frac{2}{1}x + 5 \dots (3)$$

16 (a) Write 640 000 000 in standard form.

$$6.4 \times 10^8$$

(b) Work out $(3 \times 10^3) + (6 \times 10^4)$
Give your answer in standard form.

$$500$$

$$5 \times 10^2$$

(Total for Question 16 is 3 marks)

L_1 and L_2 are parallel lines.

The equation of L_1 is $y = 3x + 2$

L_2 passes through the point (3, 4).

Find an equation for L_2 .

$$\begin{aligned} y &= 3x + c \\ 4 &= 3 \times 3 + c \\ 4 &= 9 + c \\ -5 &= c \end{aligned}$$

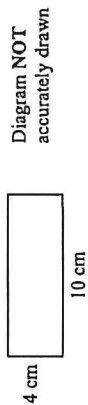
$$y = 3x - 5$$

(Total for Question 17 is 3 marks)

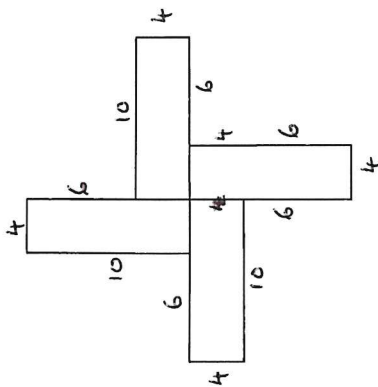
17

Turn over

18 Here is a rectangle.



The 12-sided shape below is made from 4 of these rectangles.



Work out the perimeter of the shape.

$$\begin{aligned} 4 + 6 + 10 + 4 + 6 + 4 + 6 + 4 + 6 \\ + 10 + 4 + 6 + 10 = 80 \end{aligned}$$

$$80$$

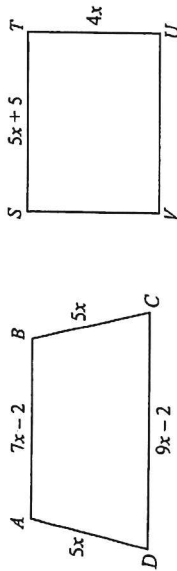
cm

(Total for Question 18 is 3 marks)

20

16 $ABCD$ is a trapezium.
 $STUV$ is a rectangle.

Diagram NOT
 accurately drawn



All measurements are in centimetres.

The two shapes have the same perimeter.

Work out the length of ST .

$$7x - 2 + 5x + 5x + 9x - 2 \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{Trapezium}$$

$$= 26x - 4$$

$$5x + 5 + 4x + 5x + 9x - 2 + 4x$$

$$= 18x + 10$$

$$26x - 4 = 18x + 10$$

$$8x = 14$$

$$x = \frac{14}{8}$$

$$x = \frac{7}{4}$$

$$ST = 5\left(\frac{7}{4}\right) + 5 = 13.75$$

(Total for Question 16 is 5 marks)

cm



17 Each day a company posts some small letters and some large letters.

The company posts all the letters by first class post.

The tables show information about the cost of sending a small letter by first class post and the cost of sending a large letter by first class post.

Small Letter		Large Letter	
Weight	First Class Post	Weight	First Class Post
0-100 g	60p	0-100 g	£1.00
		101-250 g	£1.50
		251-500 g	£1.70
		501-750 g	£2.50

One day the company wants to post 200 letters.

The ratio of the number of small letters to the number of large letters is 3:2 = 5 parts

70% of the large letters weigh 0-100 g.

The rest of the large letters weigh 101-250 g.

Work out the total cost of posting the 200 letters by first class post.

120 small letters
 80 large letters

$$70\% \text{ of } 80 = 56$$

$$(0-100g) \quad (101-250g)$$

$$200 \div 5 = 40 \leftarrow 1 \text{ part}$$

$$120 \text{ small letters} : 120 \times 60p = £72$$

$$56 \text{ } 0-100g \text{ large} : 56 \times £1.00 = £56$$

$$24 \text{ } 101-250g \text{ large} : 24 \times £1.50 = £36$$

$$\underline{\quad \quad \quad}$$

$$£164$$

(Total for Question 17 is 5 marks)



There are 18500 gallons of fuel in a fuel tank.

The fuel is pumped from the fuel tank into a plane at a rate of 1700 litres per minute.

1 gallon = 4.5 litres.

How many minutes will it take to empty the fuel tank completely?
Give your answer to the nearest minute.

$$18500 \times 4.5 = 83250$$

$$83250$$

$$83250 \div 1700 = 48.97$$

$$= 49 \text{ mins}$$

minutes

(Total for Question 4 is 3 marks)



P 4 5 8 4 0 A 0 6 2 4

The weight of a bag of potatoes is 15 kg, correct to the nearest kg.

(a) Write down the smallest possible weight of the bag of potatoes.

14.5 kg
(1)

(b) Write down the largest possible weight of the bag of potatoes.

15.5 kg
(1)

(Total for question 1 is 2 marks)

The length of a line is 81 centimetres, correct to the nearest centimetre.

(a) Write down the least possible length of the line.

80.5 cm
(1)

(b) Write down the greatest possible length of the line.

81.5 cm
(1)

(Total for question 2 is 2 marks)

The height of a building is measures as 11 metres, correct to the nearest metre.

(a) Write down the least possible height of the building.

10.5 m
(1)

(b) Write down the greatest possible height of the building.

11.5 m
(1)

(Total for question 3 is 2 marks)

10 A number y is rounded to 1 decimal place.

The result is 0.7

Write down the error interval for y .

$$0.65 \leq y < 0.75$$

(Total for question 10 is 2 marks)

11 A number y is rounded to 1 decimal place.

The result is 19.3

Write down the error interval for y .

$$19.25 \leq y \leq 19.35$$

(Total for question 11 is 2 marks)

12 A number y is rounded to 2 decimal places.

The result is 1.26

Write down the error interval for y .

$$1.255 \leq y < 1.265$$

(Total for question 12 is 2 marks)

13 A number x is rounded to 2 decimal places.

The result is 2.35

Write down the error interval for x .

$$2.345 \leq x < 2.355$$

(Total for question 13 is 2 marks)

14 A number x is rounded to 3 decimal places.

The result is 8.124

Write down the error interval for x .

$$8.1235 \leq x < 8.1245$$

(Total for question 14 is 2 marks)

15 A number x is rounded to 3 significant figures.

The result is 5.67

Write down the error interval for x .

$$5.665 \leq x < 5.675$$

(Total for question 15 is 2 marks)

- 19 A number x is rounded to 2 significant figures.

The result is 210

Write down the error interval for x .

$$205 \leq x < 215$$

(Total for question 19 is 2 marks)

- 20 A number x is rounded to 3 significant figures.

The result is 0.458

Write down the error interval for x .

$$0.4575 \leq x < 0.4585$$

(Total for question 20 is 2 marks)

- 21 A number x is rounded to 1 significant figure.

The result is 6000

Write down the error interval for x .

$$5500 \leq x < 6500$$

(Total for question 21 is 2 marks)

- 11 (a) Solve $3x^2 = 147$

$$x^2 = 147 \div 3$$

$$x^2 = 49$$

$$x = 7$$

$$7$$

- (b) Work out the value of 2^{-3}

$$\frac{1}{8}$$

- (c) Simplify $(3x^2)^3$

$$(3^3)(x^2)^3$$

$$27x^6$$

$$w = 4p - 16$$

- (d) Make p the subject of this formula.

$$\frac{w + 16}{4} = \frac{4p}{4}$$

$$\frac{w + 16}{4}$$

$$\frac{w + 16}{4} = p$$

(Total for Question 11 is 7 marks)



16 (a) Simplify

$$(m^{-2})^3$$

$$m^{-10}$$

(b) Factorise

$$x^2 + 3x - 10$$

$$(x+5)(x-2)$$

(Total for Question 16 is 3 marks)

17 (a) Write down the value of 10^9

$$1$$

(b) Write 6.7×10^{-3} as an ordinary number.

$$0.000067$$

(c) Work out the value of $(3 \times 10^7) \times (9 \times 10^6)$
Give your answer in standard form.

(Press in your calculator)

$$2.7 \times 10^{14}$$

(Total for Question 17 is 4 marks)

10 (a) Expand $x(x+2)$

$$x^2 + 2x$$

(b) Expand and simplify $3(y+2) + 4(x-1)$

$$3y + 6 + 4x - 4$$

$$3y + 2 + 4x$$

$$3y + 2 + 4x$$

(c) Expand and simplify $(2t-3)(t+5)$

$$2t^2 + 10t - 3t - 15$$

$$2t^2 + 7t - 15$$

$$2t^2 + 7t - 15$$

(d) Factorise fully $8a^2 + 12a$

$$4a(2a+3)$$

$$4a(2a+3)$$

(e) Factorise $y^2 - y - 2$

$$(y-2)(y+1)$$

(Total for Question 10 is 9 marks)



11 (a) Expand $4(3x + 5)$

$$12x + 20$$

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

$$2x - 8 + 3x + 15$$

$$5x + 7$$

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

$$x^2 + 6x + 4x + 24$$

$$x^2 + 10x + 24$$

$$x^2 + 10x + 24$$

(Total for Question 11 is 5 marks)



12 You can change temperatures from $^{\circ}\text{F}$ to $^{\circ}\text{C}$ by using the formula

$$C = \frac{5(F - 32)}{9}$$

F is the temperature in $^{\circ}\text{F}$.
 C is the temperature in $^{\circ}\text{C}$.

The minimum temperature in an elderly person's home should be 20°C .

Mrs Smith is an elderly person.

The temperature in Mrs Smith's home is 77°F .

* (a) Decide whether or not the temperature in Mrs Smith's home is lower than the minimum temperature should be.

$$= \frac{5(77 - 32)}{9}$$

$$= 25^{\circ}\text{C}, \underline{\underline{20}}$$

(b) Make F the subject of the formula $C = \frac{5(F - 32)}{9}$

$$9C = 5F - 160$$

$$\frac{9C + 160}{5} = \frac{5F}{5}$$

$$\frac{9C + 160}{5} = F$$

(Total for Question 12 is 6 marks)



12. Make t the subject of the formula

$$2(t-5) = y$$

$$2t - 10 = \frac{y}{2} + 10$$

$$2t = \frac{y}{2} + 20$$

$$t = \frac{y + 40}{2}$$

$$t = \dots\dots\dots$$

(Total 3 marks)

13. Make n the subject of the formula

$$m = 5n - 21$$

$$m + 21 = 5n - 21 + 21$$

$$\frac{m + 21}{5} = \frac{5n}{5}$$

$$\frac{m + 21}{5} = n$$

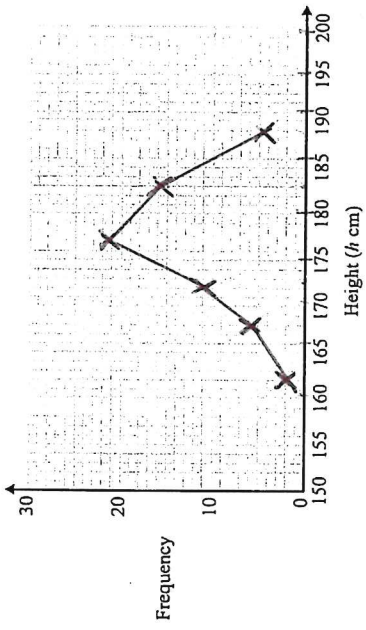
$$n = \dots\dots\dots$$

(Total 2 marks)

8. The frequency table gives information about the heights of some people.

Height (h cm)	Frequency
$160 < h \leq 165$	2
$165 < h \leq 170$	5
$170 < h \leq 175$	10
$175 < h \leq 180$	21
$180 < h \leq 185$	16
$185 < h \leq 190$	4

Draw a frequency polygon for this information.



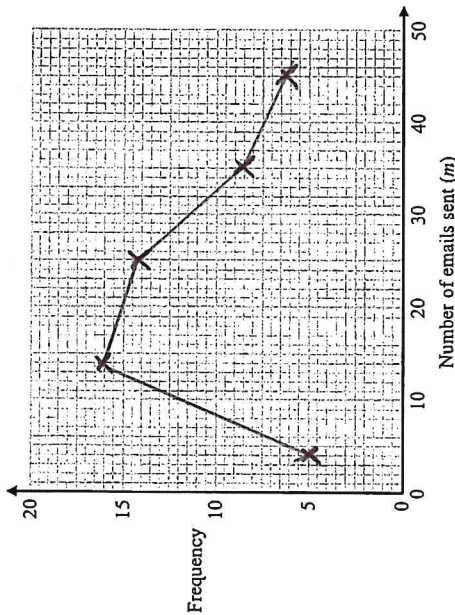
(Total for Question 8 is 2 marks)



9 The frequency table gives information about the numbers of emails sent by 51 teachers on Monday.

Number of emails sent (m)	Frequency
$0 < m \leq 10$	5
$10 < m \leq 20$	17
$20 < m \leq 30$	14
$30 < m \leq 40$	9
$40 < m \leq 50$	6

(a) On the grid below, draw a frequency polygon for this information.



*(b) Nalini says that at least a quarter of those teachers sent more than 30 emails.

Is Nalini correct?
You must explain your answer.

$$\frac{15 \times 100}{51} = 29.4\%, \text{ YES}$$

(Total for Question 9 is 4 marks)



9
Turn over

9 Linda is going on holiday to the Czech Republic. She needs to change some money into koruna.

She can only change her money into 100 koruna notes.

Linda only wants to change up to £200 into koruna.

She wants as many 100 koruna notes as possible.

The exchange rate is £1 = 25.82 koruna.

How many 100 koruna notes should she get?

$$\begin{aligned} 200 \times 25.82 \\ = 5164 \text{ koruna} \\ = 5164 \div 100 \text{ notes} \\ = 51.64 \\ = 52 \sim \underline{51 \text{ notes}} \end{aligned}$$

not enough money

m is an integer such that $-2 < m \leq 3$

(a) Write down all the possible values of m .

$$-1, 0, 1, 2, 3$$

(b) Solve $7x - 9 < 3x + 4$

$$\begin{aligned} 7x - 9 &= 3x + 4 \\ +9 & \quad +9 \\ 7x &= 3x + 13 \\ -3x & \quad -3x \\ 4x &= 13 \\ x &= \frac{13}{4} \end{aligned}$$

(Total for Question 10 is 4 marks)



11
Turn over

160 cm of gold wire has a weight of 17.8 grams.
Work out the weight of 210 cm of the gold wire.

$$160 \text{ cm} = 17.8 \text{ g}$$

$$1 \text{ cm} = \frac{17.8}{160} = 0.11125$$

$$210 \text{ cm} = 0.11125 \times 210 = \underline{\underline{23.4}} \text{ grams}$$

(Total for Question 7 is 3 marks)

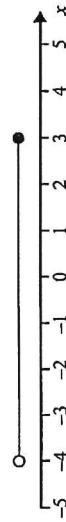
(a) n is an integer.

$$-1 \leq n < 4$$

List the possible values of n .

-1, 0, 1, 2, 3

(b)



Write down the inequality shown in the diagram.

$$-4 < x \leq 3$$

(c) Solve $3y - 2 > 5$

$$3y - 2 = 5$$

$$+2 \quad +2$$

$$3y = 7$$

$$y = \frac{7}{3}$$

$$y > \frac{7}{3}$$

(Total for Question 8 is 6 marks)



17 (a) Solve $3x - 5 < 16$

$$3x - 5 = 16$$

$$+5 \quad +5$$

$$\frac{3x}{3} = \frac{21}{3}$$

$$x = 7$$

$$x < 7$$

(b) Solve $\frac{11-w}{4} = 1 + w$

$$11 - w = (1 + w) \times 4$$

$$11 - w = 4 + 4w$$

$$-4 \quad -4$$

$$7 - w = 4w$$

$$+w \quad +w$$

$$7 = 5w$$

$$w = \frac{7}{5}$$

$$w = 1.4$$

(Total for Question 17 is 5 marks)

$$\frac{7}{5} = w$$

$$1.4 = w$$



$$12 - 3 < n \leq 1$$

n is an integer.

(a) Write down all the possible values of n .

$-2, -1, 0, 1$

(b) Solve the inequality

$$3p - 7 > 11$$

$$3p - 7 = 11$$

$$3p = 18$$

$$p = \frac{18}{3} = 6$$

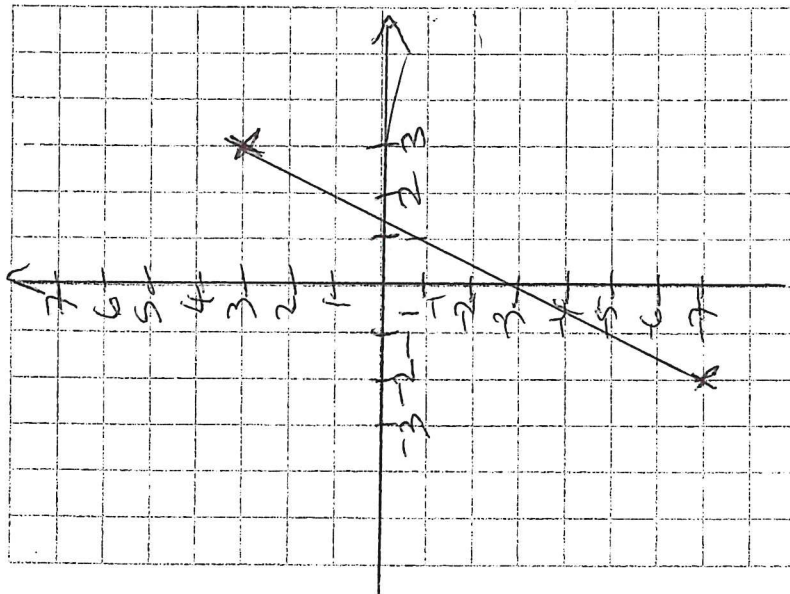
$$p > 6$$

(Total for Question 12 is 4 marks)



25 On the grid, draw the graph of $y = 2x - 3$ for values of x from -2 to 3

x	-2	3
y	-7	3



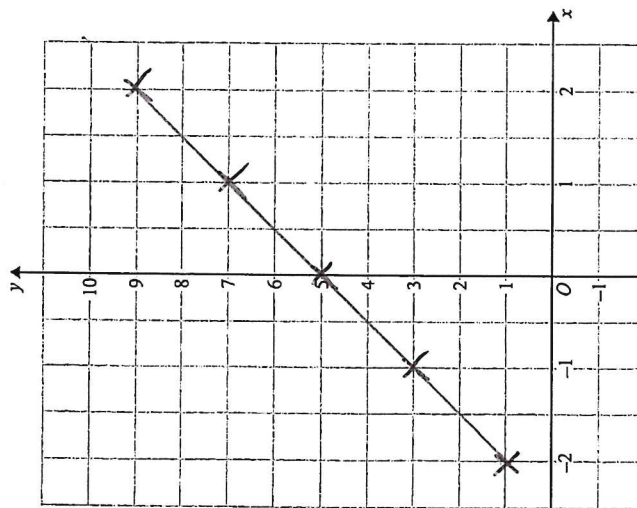
(Total for Question 25 is 4 marks)



4 (a) Complete the table of values for $y = 2x + 5$

x	-2	-1	0	1	2
y	1	3	5	7	9

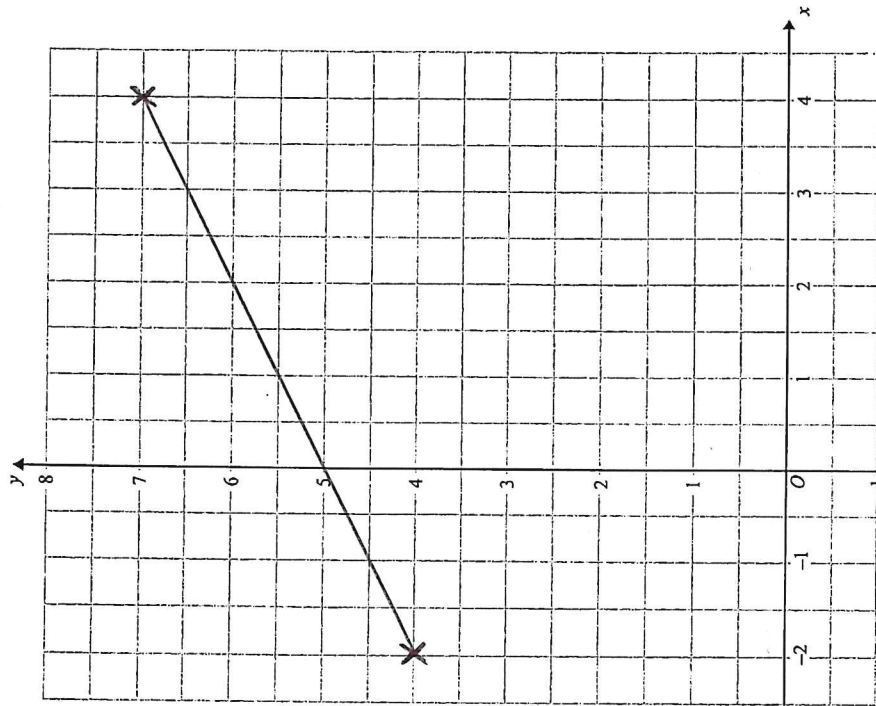
(b) On the grid, draw the graph of $y = 2x + 5$ for values of x from -2 to $x = 2$



(Total for Question 4 is 4 marks)

12 On the grid, draw the graph of $y = \frac{1}{2}x + 5$ for values of x from -2 to 4

x	-2	4
y	4	7



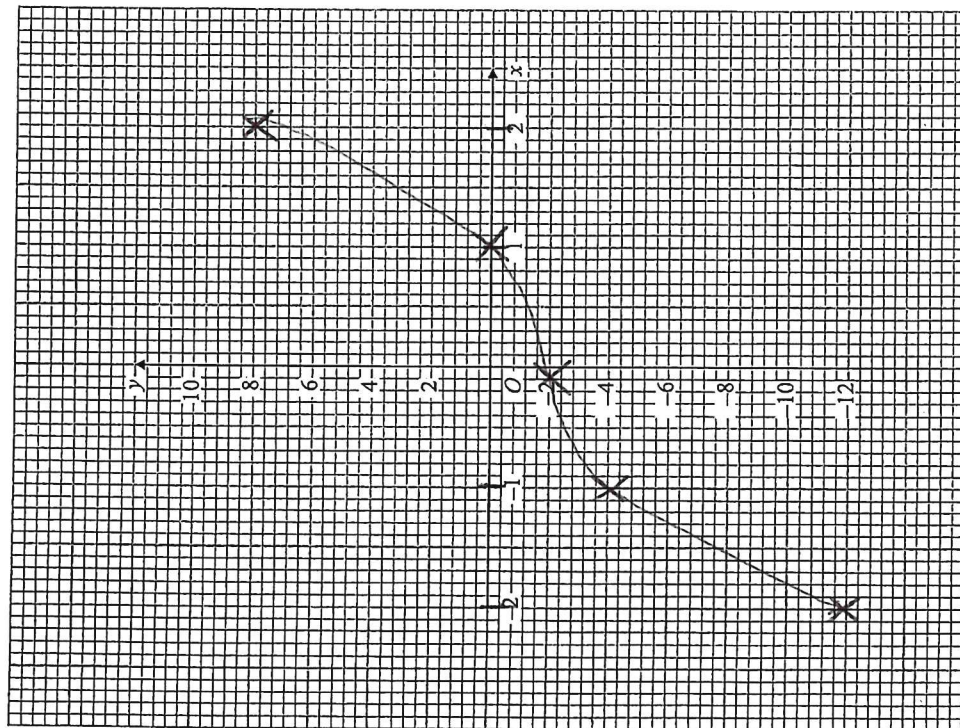
(Total for Question 12 is 3 marks)



3(a) Complete the table of values for $y = x^3 + x - 2$

x	-2	-1	0	1	2
y	-12	-4	-2	0	8

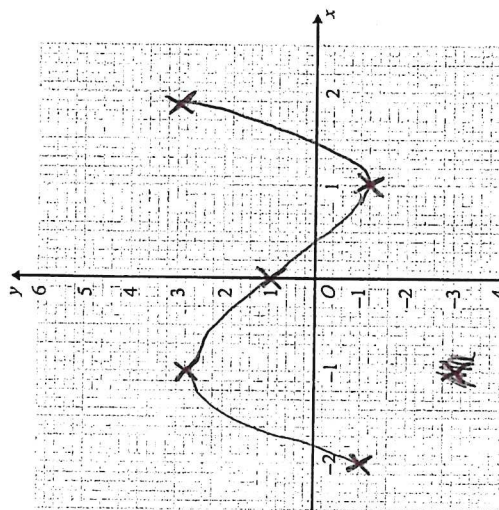
b) On the grid, draw the graph of $y = x^3 + x - 2$



13 (a) Complete the table of values for $y = x^3 - 3x + 1$

x	-2	-1	0	1	2
y	-1	3	1	-1	3

(b) On the grid, draw the graph of $y = x^3 - 3x + 1$ for values of x from -2 to 2



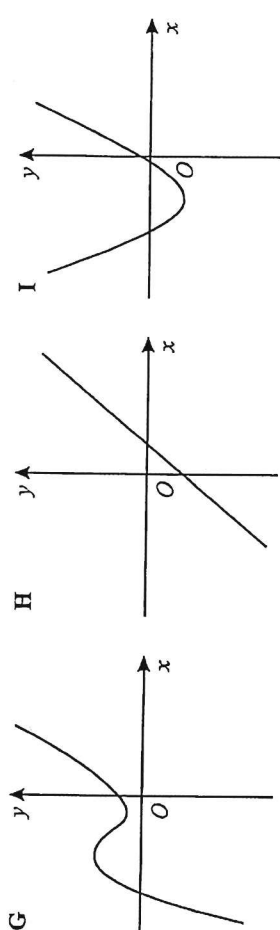
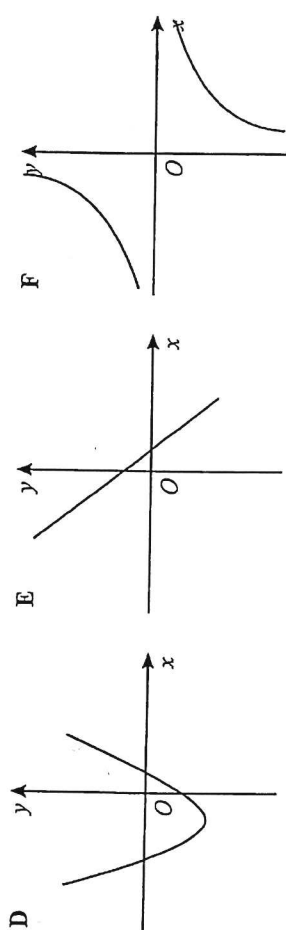
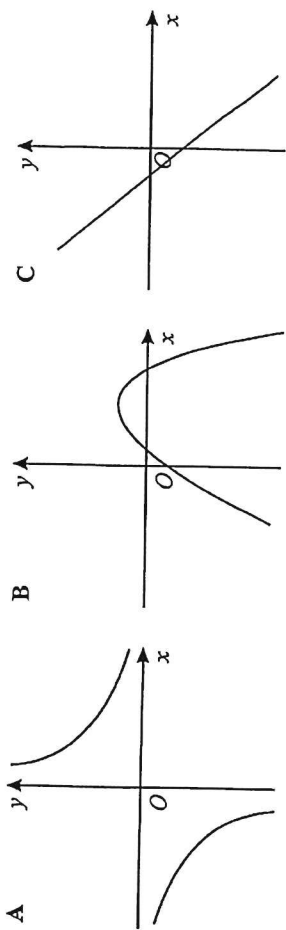
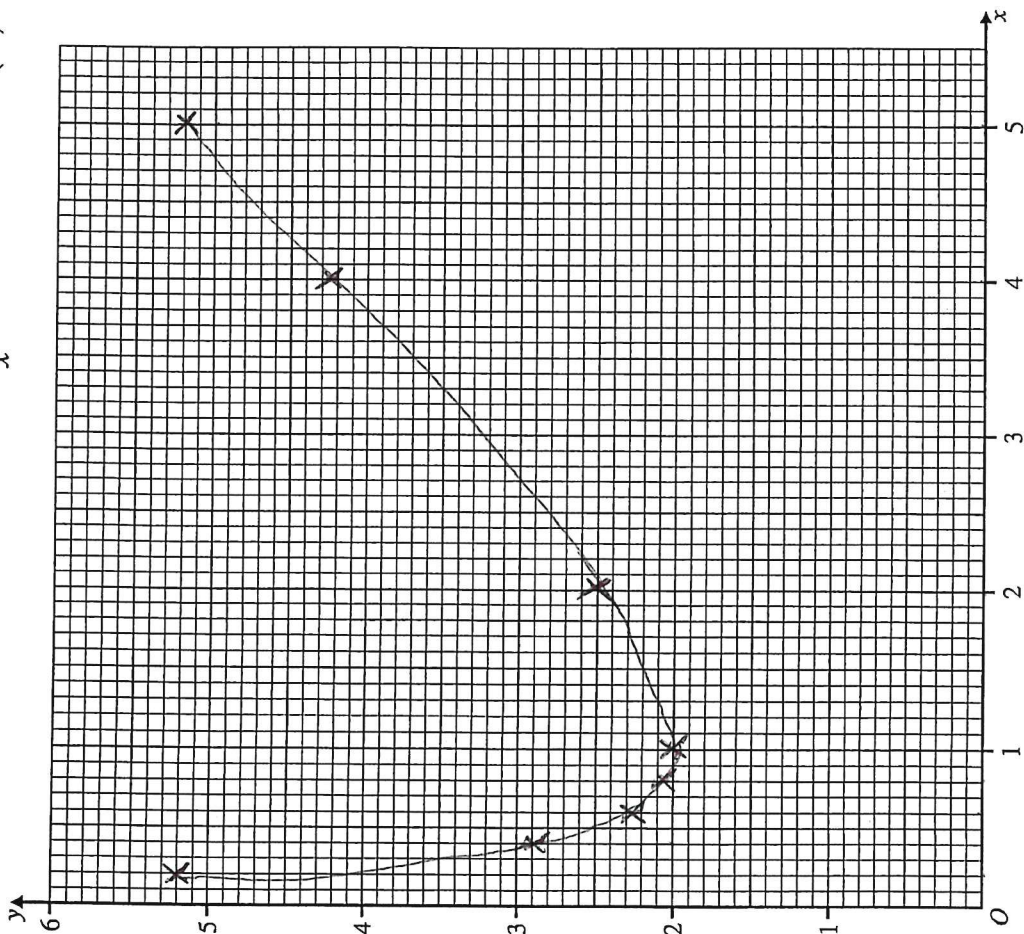
(Total for Question 13 is 4 marks)



6(a) Complete the table of values for $y = x + \frac{1}{x}$ (2)

x	0.2	0.4	0.6	0.8	1	2	4	5
y	5.2	2.9	2.26	2.05	2	2.5	4.25	5.2

b) On the grid, draw the graph of $y = x + \frac{1}{x}$ (2)



1. Write down the letter of the graph which could have the equation

(i) $y = 3x - 2$

..... H (1)

(ii) $y = 2x^2 + 5x - 3$

..... D (1)

(iii) $y = \frac{3}{x}$

..... A (1)

10 In the UK, petrol cost £1.24 per litre.
In the USA, petrol cost 3.15 dollars per US gallon.

1 US gallon = 3.79 litres
£1 = 1.47 dollars

Was petrol cheaper in the UK or in the USA?

$$3.15 \div 3.79 = 0.8311$$

$$0.8311 \times 1.47 = £1.22$$

USA

(Total for Question 10 is 4 marks)

12



P 4 0 6 7 5 A 0 1 2 2 8

22 Margaret is on holiday in France.

She buys an English newspaper.

The cost of the newspaper is 5 euros.

In England, the cost of the same newspaper is £2.50

The exchange rate is £1 = 1.16 euros.

Work out the difference between the cost of the newspaper in France and the cost of the newspaper in England.

$$2.5 \times 1.16 = £2.90$$

$$£2.90 - £2.50 = 40p.$$

(Total for Question 22 is 3 marks)

23 (a) Factorise $3x + 6$

$$3(x+2)$$

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

$$5y - 10 + 2y - 6.$$

$$7y - 16.$$

(Total for Question 23 is 3 marks)

24



P 4 4 5 8 6 A 0 2 4 2 8

11, 16

16 Derek buys a house for £150 000
He sells the house for £154 500

(a) Work out Derek's percentage profit.

$$\begin{aligned} &£154\,500 - £150\,000 \\ &= £4\,500 \end{aligned}$$

$$£4\,500 \div £150\,000 \times 100$$

3 %

Derek invests £154 500 for 2 years at 4% per year compound interest.

(b) Work out the value of the investment at the end of 2 years.

$$\begin{aligned} &£154\,500 \times 1.04^2 \\ &= £167\,107.20 \end{aligned}$$

£

(Total for Question 16 is 6 marks)



5. Abi invests £500 for 4 years in a bank account.

The account pays simple interest at a rate of 2.3% per year.

Work out the total amount of interest Abi has got at the end of 4 years.

$$2.3 \times £500 = £11.50$$

$$£11.50 \times 4 = £46$$

£ 46 [3]

6. Toby invested £7500 for 2 years in a savings account.

He was paid 4% per annum compound interest.

How much money did Toby have in his savings account at the end of 2 years?

$$£7500 \times 1.04^2$$

£ 8112 [2]

14 Peter has £20 000 to invest in a savings account for 2 years.
He finds information about two savings accounts.

Bonus Saver	Fixed Rate
Compound interest 4% for the first year then 1.5% each year	Compound interest 2.5% each year

Peter wants to have as much money as possible in his savings account at the end of 2 years.
Which of these savings accounts should he choose?

Bonus Saver

$$\begin{aligned} £20,000 \times 1.04 &= £20,800 \\ £20,800 \times 1.015 &= £21,112. \end{aligned}$$

Fixed Rate

$$£20,000 \times 1.025^2 = £21,012.50$$

Bonus Saver

(Total for Question 14 is 4 marks)



11 Colin works on 5 days each week.
Each day he drives from his home to work and from work to his home.

Colin pays £3.50 each day to use the car park at work.

The distance from Colin's home to work is 18 miles.
Colin's car uses one gallon of petrol every 45.2 miles.

1 litre of petrol costs 136.9p
1 gallon = 4.546 litres

Work out the total cost for Colin to use his car for work each week.
You must show all your working.

$$18 \times 2 = 36 \text{ miles each day}$$

$$36 \times 5 = 180 \text{ miles for 5 days}$$

$$180 \div 45.2 = 3.98 \text{ gallons}$$

$$\begin{aligned} 1 \text{ gallon} &= 4.546 \times £1.369 \\ &= £6.22 \end{aligned}$$

$$£6.22 \times 3.98 = £24.76$$

$$\text{Cost of petrol} = £24.76$$

$$\begin{aligned} \text{Cost of car park} &= £3.50 \times 5 = £17.50 \\ £24.76 + £17.50 &= \end{aligned}$$

$$£42.26$$

(Total for Question 11 is 5 marks)



5 Ben goes on holiday to Hong Kong.

In Hong Kong, Ben sees a camera costing HK\$3179.55

In London, an identical camera costs £285

The exchange rate is £1 = HK\$12.30

Ben buys the camera in Hong Kong.

How much cheaper is the camera in Hong Kong than in London?

$$3179.55 \div 12.3 = £258.50$$

$$£285 - £258.50 = £26.50$$

£26.50

(Total for Question 5 is 3 marks)

8 Here are the first four terms of an arithmetic sequence.

3 10 17 24

(a) Find, in terms of n , an expression for the n th term of this arithmetic sequence.

$$7n - 4$$

(b) Is 150 a term of this sequence?

You must explain how you get your answer.

$$150 - 4 = 146$$

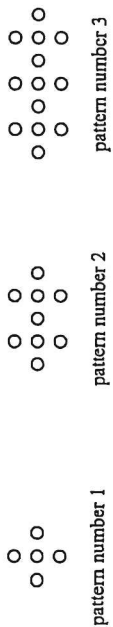
$$146 \div 7 = 20.857$$

150 is not a term in this sequence as this is not a whole number

(Total for Question 8 is 4 marks)



14 Here is a sequence of patterns made with counters.



(a) In the space below, draw pattern number 4



(b) Complete the table.

Pattern number	1	2	3	4	5
Number of counters	5	9	13	17	21

(c) Find an expression, in terms of n , for the number of counters in pattern number n .

$4n + 1$

Habecb has 50 counters.

He wants to use as many of his counters as possible to make a pattern in the sequence.

(d) What is the number of the pattern he can make using the greatest number of his counters?

6 7 8 9 10 11 12
25 29 33 37 41 45 49

12

(Total for Question 14 is 6 marks)



17
Turn over

12 Here are the first five terms of an arithmetic sequence.

4 9 14 19 24

(a) Find, in terms of n , an expression for the n th term of this sequence.

$5n - 1$

Here are the first five terms of a different sequence.

2 2 0 -4 -10

An expression for the n th term of this sequence is $3n - n^2$

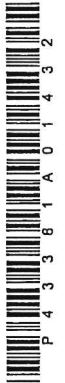
(b) Write down, in terms of n , an expression for the n th term of a sequence whose first five terms are

4 4 0 -8 -20

$2(3n - n^2)$

(Total for Question 12 is 3 marks)

14



"Full Coverage": Sequences

This worksheet is designed to cover one question of each type seen in past papers, for each GCSE Higher Tier topic. This worksheet was automatically generated by the DrFrostMaths Homework Platform: students can practice this set of questions interactively by going to www.drfrostmaths.com/homework, logging on, *Practise* → *Past Papers/Worksheets* (or *Library* → *Past/Past Papers* for teachers), and using the 'Revision' tab.

Question 1

Categorisation: Determine a term of a formula given the position-to-term formula.

[Edexcel GCSE(9-1) Mock Set 2 Spring 2017 1F Q24b, 1H Q7b]

Here are the first 7 terms of a quadratic sequence.

3 6 11 18 27 38 51

The n th term of the sequence is $n^2 + 2$.

(b) Find the 50th term of the sequence.

2502

Question 2

Categorisation: Determine an algebraic expression for a term of a sequence given a term-to-term rule.

[Edexcel New SAMs Paper 3F Q20b, Paper 3H Q3b]

Here are the first six terms of a Fibonacci sequence.

1 1 2 3 5 8

The rule to continue a Fibonacci sequence is,

the next term in the sequence is the sum of the two previous terms

The first three terms of a different Fibonacci sequence are

a b $a+b$ $a+2b$ $2a+3b$ $3a+5b$

Find the 6th term of this sequence, in terms of a and b . Simplify your answer.

$3a+5b$

93

In a sale, normal prices are reduced by 15%.
The sale price of a CD player is £102

Work out the normal price of the CD player.

$$£102 \times 1.15 = £117.30$$

94

A garage sells cars.

It offers a discount of 20% off the normal price for cash.

Dave pays £5200 cash for a car.

Calculate the normal price of the car.

$$£5200 \times 1.2 = £6240$$

£117.30

(Total 3 marks)

£6240

(Total 3 marks)

16 The normal price of a television is reduced by 30% in a sale.
The sale price of the television is £350
Work out the normal price of the television.

$$£350 \times 1.3$$

£1155

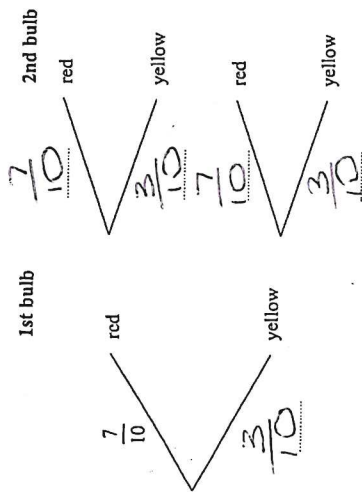
(Total for Question 16 is 3 marks)



P 4 3 5 9 8 A 0 1 4 2 8

23 Yvonne has 10 tulip bulbs in a bag.
7 of the tulip bulbs will grow into red tulips.
3 of the tulip bulbs will grow into yellow tulips.
Yvonne takes at random two tulip bulbs from the bag.
She plants the bulbs.

(a) Complete the probability tree diagram.



(b) Work out the probability that at least one of the bulbs will grow into a yellow tulip.

$$\begin{aligned} \frac{7}{10} \times \frac{3}{10} &= \frac{21}{100} & RY \\ \frac{7}{10} \times \frac{6}{9} &= \frac{21}{30} & YR \\ \frac{3}{10} \times \frac{7}{9} &= \frac{7}{30} & YR \\ \frac{21}{100} + \frac{21}{30} + \frac{7}{30} &= \frac{51}{100} \end{aligned}$$

(Total for Question 23 is 5 marks)

Turn over



P 4 4 0 2 2 A 0 2 5 2 8

5 Jane has a packet of seeds.

The probability that a seed will grow is 0.75

(a) What is the probability that a seed will not grow?

$$1 - 0.75 = 0.25$$

$$0.25$$

Jane plants 200 of these seeds.

(b) Estimate the number of the seeds that will grow.

$$0.75 \times 200 = 150$$

$$150$$

(Total for Question 5 is 3 marks)



P 4 3 3 8 3 A 0 7 2 8

Turn over

7

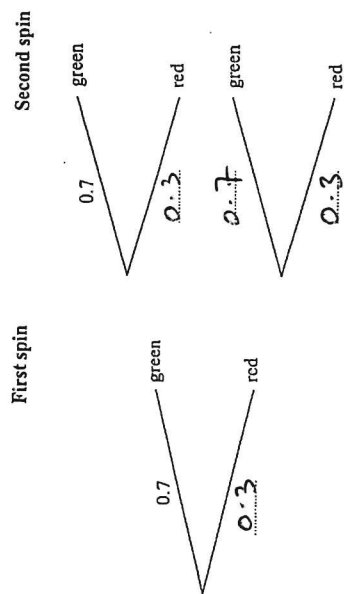
19 Louise makes a spinner.

The spinner can land on green or on red.

The probability that the spinner will land on green is 0.7

Louise spins the spinner twice.

(a) Complete the probability tree diagram.



(b) Work out the probability that the spinner lands on two different colours.

Green & Red Or Red & Green

$$0.7 \times 0.3 + 0.3 \times 0.7$$

$$= 0.21 + 0.21$$

$$= 0.42$$

$$0.42$$

(Total for Question 19 is 5 marks)

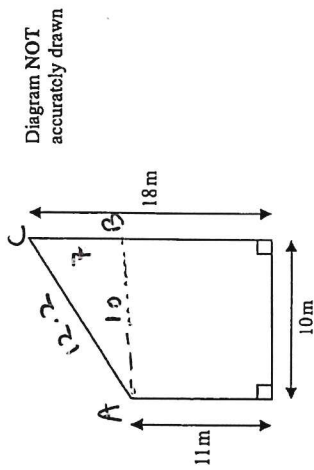


P 4 4 5 8 7 A 0 2 1 2 8

21

Turn over

7 Here is part of a field.



This part of the field is in the shape of a trapezium.
A farmer wants to put a fence all the way around the edge of this part of the field.

The farmer has 50m of fence.

Does he have enough fence?
You must show all your working.

From triangle ABC

$$AC = \sqrt{10^2 + 7^2} = \sqrt{149} = 12.2 \text{ m}$$

Adding all sides, the farmer needs

$$11 + 10 + 18 + 12.2 = 51.2 \text{ m}$$

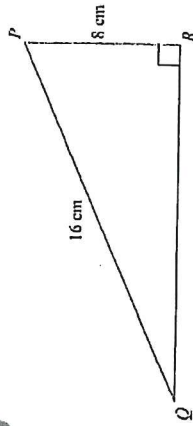
No he doesn't have enough fence to put around the field.

(Total for Question 7 is 5 marks)



P 4 5 8 4 0 A 0 8 2 4

Diagram NOT
accurately drawn



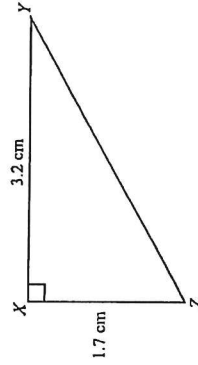
PQR is a right-angled triangle.
PQ = 16 cm.
PR = 8 cm.

Calculate the length of QR.
Give your answer correct to 2 decimal places.

$$QR = \sqrt{16^2 - 8^2} = 13.86 \text{ cm}$$

.....13.86..... cm
(3 marks)

Diagram NOT
accurately drawn



XYZ is a right-angled triangle.
XY = 3.2 cm.
XZ = 1.7 cm.

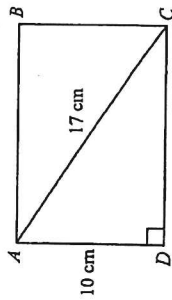
Calculate the length of YZ.

Give your answer correct to 3 significant figures.

$$YZ = \sqrt{3.2^2 + 1.7^2} = 3.62$$

.....3.62..... cm
(3 marks)

102

Diagram NOT
accurately drawn

$ABCD$ is a rectangle.

$AC = 17$ cm.

$AD = 10$ cm.

Calculate the length of the side CD .

Give your answer correct to one decimal place.

$$CD = \sqrt{17^2 - 10^2} = 13.7$$

..... 13.7 cm

(3 marks)

103

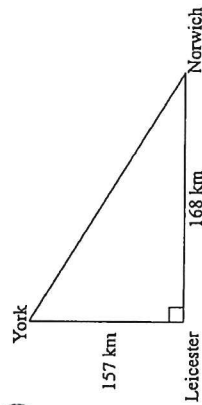


Diagram NOT accurately drawn

The diagram shows three cities.

Norwich is 168 km due East of Leicester.

York is 157 km due North of Leicester.

Calculate the distance between Norwich and York.

Give your answer correct to the nearest kilometre.

Distance between Norwich and

$$\text{York} = \sqrt{157^2 + 168^2} = 229.94$$

..... 230 km

(3 marks)

20 Here are the ingredients needed to make 10 pancakes.

Pancakes	
Ingredients to make 10 pancakes	
300 ml	of milk
120 g	of flour
2	eggs

Matthew makes 30 pancakes.

(a) Work out how much flour he uses.

$$\begin{aligned} 10 \text{ pancakes} &= 120\text{g} \\ 30 \text{ pancakes} &= 3 \times 120 = 360\text{g} \end{aligned}$$

..... 360 g

Tara makes some pancakes.

She uses 750 ml of milk.

(b) Work out how many pancakes she makes.

$$\begin{aligned} 10 \text{ pancakes} &= 300\text{ml} \\ 10 \text{ pancakes} &= 300\text{ml} \\ 5 \text{ pancakes} &= 150\text{ml} \\ \hline 25 & \end{aligned}$$

..... 25 pancakes

(Total for Question 20 is 4 marks)



7 Colin, Dave and Emma share some money.

Colin gets $\frac{2}{10}$ of the money.

Emma and Dave share the rest of the money in the ratio 3 : 2

What is Dave's share of the money?

Suppose total money = £100

$$\text{Colin's share} = \frac{2}{10} \text{ of } 100 = \frac{2}{10} \times 100 = £20$$

$$\text{Remaining} = 100 - 20 = 80$$

Emma: Dave

3 : 2

Total share 3+2=5

$$\text{Dave's share} = \frac{2}{5} \text{ of } 80 = \frac{2}{5} \times 80 = £32$$

$$\text{Dave's share} = \frac{2}{5} \text{ of } 80 = \frac{2}{5} \times 80 = £32$$

(Total for Question 7 is 4 marks)



P 4 3 6 0 0 A 0 9 2 8

9

Turn over

2 Here is a list of ingredients for making 18 mince pies.

Ingredients for 18 mince pies

225 g of butter
350 g of flour
100 g of sugar
280 g of mincemeat
1 egg

Elaine wants to make 45 mince pies.

Elaine has

1 kg of butter = 1000g
1 kg of flour = 1000g
500 g of sugar
600 g of mincemeat
6 eggs

Does Elaine have enough of each ingredient to make 45 mince pies?
You must show clearly how you got your answer.

According to question

Ingredients of 1 mince pie

(pies) will be:

$$\text{Butter} = 225 \div 2 = 112.5 \text{ g}$$

$$\text{Flour} = 350 \div 2 = 175 \text{ g}$$

$$\text{sugar} = 100 \div 2 = 50 \text{ g}$$

$$\text{mincemeat} = 280 \div 2 = 140 \text{ g}$$

$$\text{eggs} = 1 \div 2 = \frac{1}{2} \text{ egg}$$

Ingredients of 45 mince pies 9x5=45

$$= 562.5 \text{ g butter}$$

$$= 875 \text{ g flour}$$

$$= 250 \text{ g sugar}$$

$$= 700 \text{ g mincemeat}$$

$$= 2 \frac{1}{2} \text{ eggs}$$

Elaine can not make 45 mince pies because she does not have enough mince meat

(Total for Question 2 is 4 marks)



P 4 3 6 0 0 A 0 4 2 8

4

The ratio of girls to boys in a school is 2 : 3

(a) What fraction of these students are boys?

$$\frac{G}{B} = \frac{2}{3}$$

$$\frac{3}{3+2} = \frac{3}{5}$$

(2)

In Year 8 the ratio of girls to boys is 1 : 3

There are 300 students in Year 8.

(b) Work out the number of girls in Year 8.

$$\begin{aligned} B:G &= 1:3 \\ \text{Total} &= 1+3=4 \end{aligned}$$

$$\begin{aligned} \text{Girls} &= \frac{3}{4} \text{ of } 300 \\ &= 225 \end{aligned}$$

(3) (5 marks)

8. Ann and Bob shared £240 in the ratio 3 : 5

Ann gave a half of her share to Colin.

Bob gave a tenth of his share to Colin.

What fraction of the £240 did Colin receive?

Ann : Bob

$$3 : 5 \quad \text{Total shares} = 3+5=8$$

$$\text{Ann's share} = \frac{3}{8} \times 240 = £90$$

$$\text{Bob's share} = \frac{5}{8} \times 240 = £150$$

$$\text{Ann gave } \frac{90}{2} = £45 \text{ to Colin}$$

$$\text{Bob gives to Colin} = \frac{1}{10} \times 150 = £15$$

$$\text{Colin gets } 45 + 15 = 60$$

$$\text{Fraction amount that Colin gets} = \frac{60}{240} = \frac{1}{4}$$

$$\frac{1}{4} \quad (5 \text{ marks})$$

5 schools sent some students to a conference.

One of the schools sent both boys and girls.

This school sent 16 boys.

The ratio of the number of boys it sent to the number of girls it sent was 1 : 2

The other 4 schools sent only girls.

Each of the 5 schools sent the same number of students.

Work out the total number of students sent to the conference by these 5 schools.

School 1

$$\begin{aligned} \text{Boys: Girls} &= 1:2 \\ 16:32 \end{aligned}$$

$$1 \times 16 + 2 \times 16$$

$$16:32$$

$$\text{Total Students sent by School 1} = 16+32 = 48$$

$$240$$

(4 marks)

12. Pat and Julie share some money in the ratio 2 : 5

Julie gets £45 more than Pat.

How much money did Pat get?

Pat : Julie

$$2 : 5$$

Since Julie gets 3 more parts than Pat equals to £45

$$3 \text{ parts} = 45$$

$$1 \text{ part} = \frac{45}{3} = 15$$

$$\begin{aligned} \text{Pat gets } 2 \times 15 &= £30 \end{aligned}$$

$$30$$

(4 marks)

$$\begin{aligned} \text{Pat} &= \square \square \square \\ \text{Julie} &= \square \square \square \square \square \end{aligned}$$

13. Last year Kerry's take home pay was £15 000. She spent 40% of her take home pay on rent.

She used the rest of her take home pay for living expenses, clothes and entertainment in the ratio 3 : 1 : 2

How much did Kerry spend on entertainment last year?

$$\begin{aligned} \text{Rent} &= 40\% \text{ of } 15000 \\ &= 0.40 \times 15000 = \pounds 6000 \\ \text{Remaining} &= 15000 - 6000 = 9000 \\ \text{Kerry spends on entertainment} &= \frac{3}{6} \times 9000 = \frac{18000}{6} = 3000 \end{aligned}$$

14. Talil is going to make some concrete mix.

He needs to mix cement, sand and gravel in the ratio 1 : 3 : 5 by weight.

Talil wants to make 180 kg of concrete mix.

Talil has

- 15 kg of cement
- 85 kg of sand
- 100 kg of gravel

Cement: Sand: gravel

$$1 : 3 : 5 \quad \text{Total ratio} = 1+3+5 = 9$$

$$\begin{aligned} 9 \text{ parts} &= 180 \text{ kg} \\ 1 \text{ part} &= 180 \div 9 = 20 \text{ kg} \end{aligned}$$

Does Talil have enough cement, sand and gravel to make the concrete mix?

Talil needs cement = 20 kg
 Sand = 3 x 20 = 60 kg
 Gravel = 5 x 20 = 100 kg
 NO he doesn't have enough cement

15. Jim has only 5p coins and 10p coins.

The ratio of the number of 5p coins to the number of 10p coins is 2 : 3

Work out the ratio of

the total value of the 5p coins : the total value of the 10p coins.

Give your answer in its simplest form.

$$\begin{aligned} \text{SP} &: 10\text{p} \\ 2 &: 3 \end{aligned}$$

The total value of the coins & their ratio will be

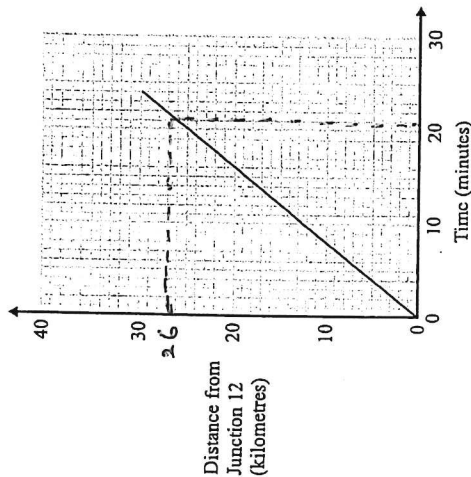
$$2 \times 5 = 10\text{p} \quad 3 \times 10 = 30\text{p}$$

$$10 : 30$$

$$\text{or } 1 : 3$$

Debbie drove from Junction 12 to Junction 13 on a motorway.

The travel graph shows Debbie's journey.



Ian also drove from Junction 12 to Junction 13 on the same motorway. He drove at an average speed of 66 km/hour.

Who had the faster average speed, Debbie or Ian? You must explain your answer.

$$\text{Ian's speed} = 66 \text{ km/h}$$

Debbie graph shows that she travelled 26 km in 20 min

$$3 \times 20 \text{ min} \rightarrow 26 \text{ km} \times 3$$

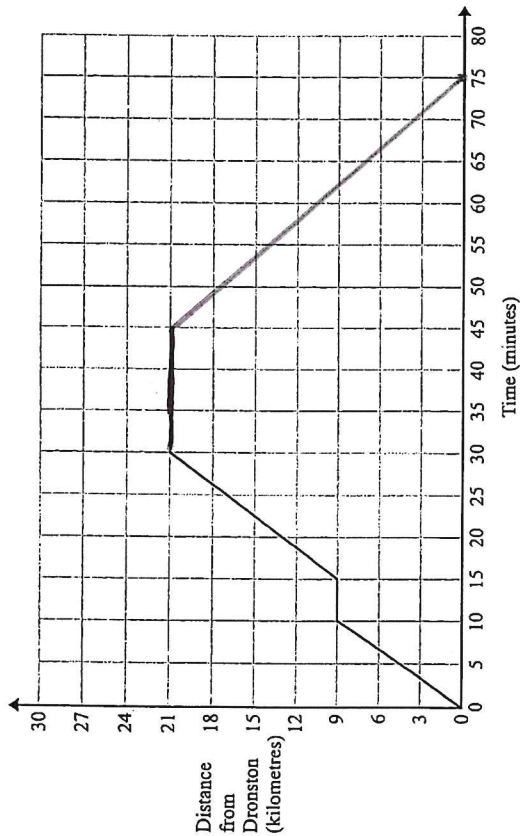
$$\begin{aligned} 60 \text{ min} &= 78 \text{ km/hour} \\ &= 1 \text{ hour} \end{aligned}$$

Debbie has faster speed per hour.

(Total for Question 11 is 4 marks)



10 A coach travels from Dronston to Luscoe.
The travel graph for this journey is shown below.



(a) Work out the average speed of the coach, in kilometres per hour, for the first 10 minutes of the journey.

10 min — 9 km
6x 60 min — 54 km
x 6 60 km/h

The coach stops in Luscoe for 15 minutes.
The coach then returns to Dronston at a constant speed of 42 km/h.

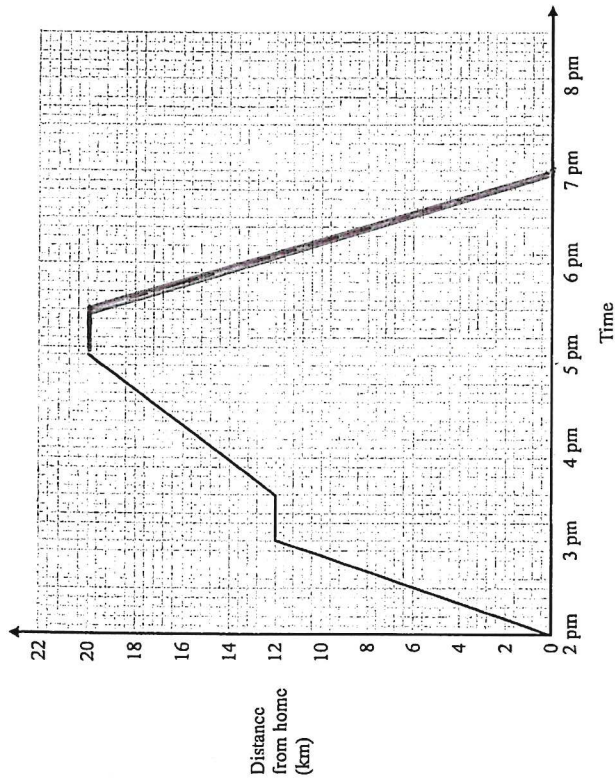
(b) Show this information on the travel graph.

On Return speed 1 hour — 42 km
÷ 2
1/2 hour — 21 km
30 min

(Total for Question 10 is 5 marks)

3 Simon went for a cycle ride.
He left home at 2 pm.

The travel graph represents part of Simon's cycle ride.



At 3 pm Simon stopped for a rest.

(a) How many minutes did he rest?

30 minutes

(b) How far was Simon from home at 5 pm?

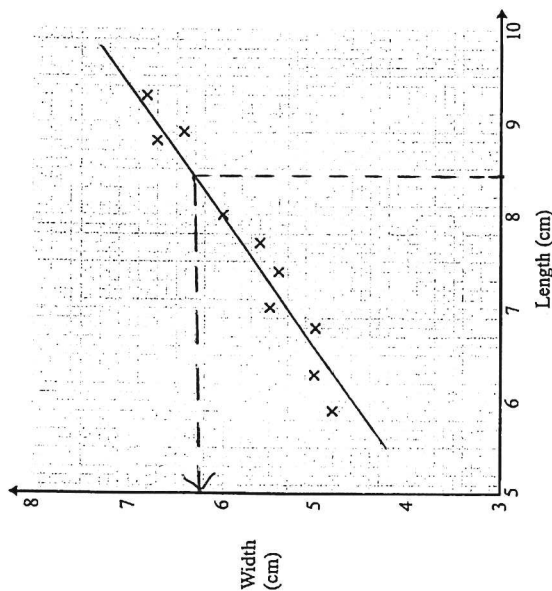
20 km

At 5 pm Simon stopped for 30 minutes.
Then he cycled home at a steady speed.
It took him 1 hour 30 minutes to get home.

(c) Complete the travel graph.

(Total for Question 3 is 4 marks)

- 21 The scatter graph shows some information about ten pine cones from the same tree. It shows the length and the width of each pine cone.



- (a) Describe the relationship between the length and the width of a pine cone.

Positive correlation

Another pine cone from this tree has a length of 8.4 cm.

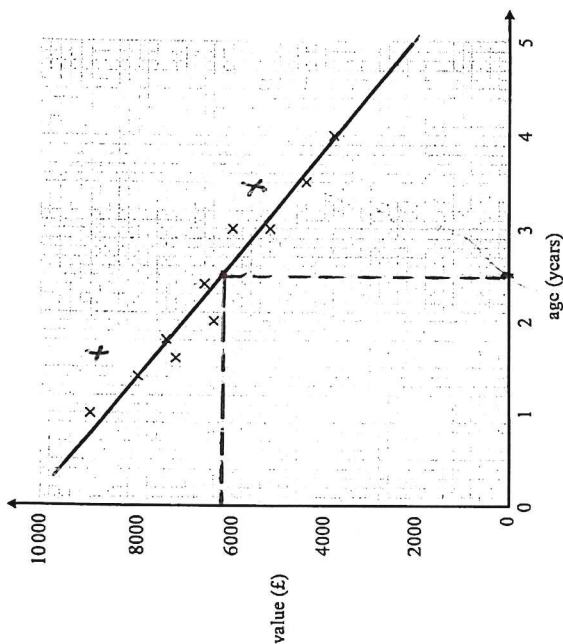
- (b) Estimate the width of this pine cone.

After drawing the line of best fit we can see the estimated width is 6.2 cm

(Total for Question 21 is 3 marks)



- 3 The scatter graph shows some information about 10 cars, of the same type and make. The graph shows the age (years) and the value (£) of each car.



The table shows the age and the value of two other cars of the same type and make.

age (years)	1	3.5
value (£)	8200	5000

- (a) On the scatter graph, plot the information from the table.

- (b) Describe the relationship between the age and the value of the cars.

Negative correlation

A car of the same type and make is $2\frac{1}{2}$ years old.

- (c) Estimate the value of the car.

from the line of best fit, the estimated value of car would be £6100

(Total for Question 3 is 4 marks)



3 Sixteen babies are born in a hospital.

Here are the weights of the babies in kilograms.

2.4 2.5 3.5 4.4 4.6 4.1 4.4 2.8
4.1 3.8 3.8 4.2 3.3 3.6 3.1 3.3

Show this information in an ordered stem and leaf diagram.

2	4	7	8
3	0	3	5
4	1	1	2

Key:
2 | 4 mean 2.4

(Total for Question 3 is 3 marks)

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

$$6 + 3t$$

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

$$6x^2 + 15x$$

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

$$m^2 + 10m + 3m + 30$$

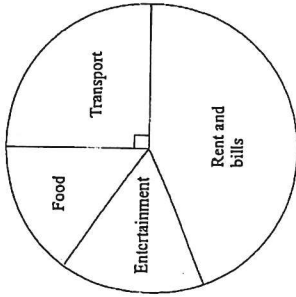
$$m^2 + 13m + 30$$

$$m^2 + 13m + 30$$

(Total for Question 4 is 5 marks)



1 The pie chart shows information about the money Fiona spent last month.



(a) What did Fiona spend most money on?

Rent and bills

(b) What fraction of Fiona's spending was on transport?

$$\frac{1}{4} \quad (1)$$

Fiona spent £320 on transport.

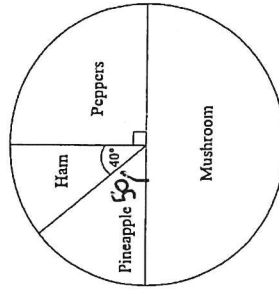
(c) How much did Fiona spend in total?

$$320 \times 3 = 960$$

$$\text{Total } 960 + 320 = 1280 \quad (2)$$

(Total for question 1 is 4 marks)

2 The pie chart shows information about the favourite pizza toppings of a group of students.



$$\frac{180}{40} = 4.5$$

$$310 - 30 = 280$$

$$18 \rightarrow 90$$

$$2 = \frac{18}{9}$$

$$10 \text{ represent frequency}$$

Use the pie chart to complete the table

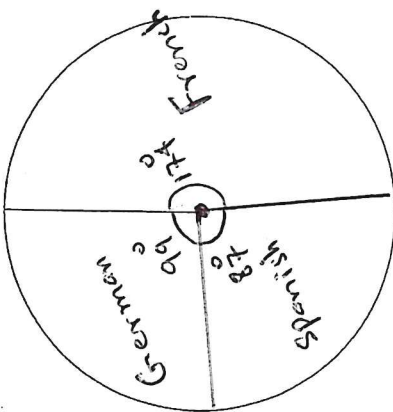
Topping	Frequency	Angle of Sector
Peppers	18	90
Mushroom	36	180
Pineapple	10	50
Ham	9	40

(Total for question 2 is 4 marks)

3 The table gives information about the languages studied by year 11 students at school A.

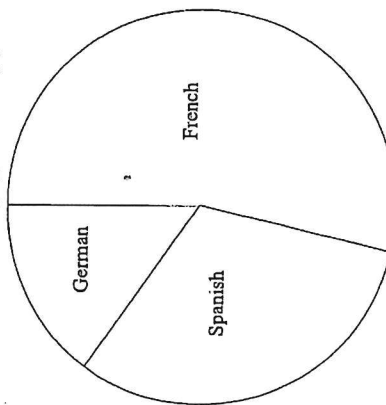
Language	French	German	Spanish
Number of Students	58	33	29

Example = $58 \times 3 = 174$ $33 \times 3 = 99$ $29 \times 3 = 87$
 Total = 120



(4)

The pie chart below shows information about the languages studied by year 11 students at school B.

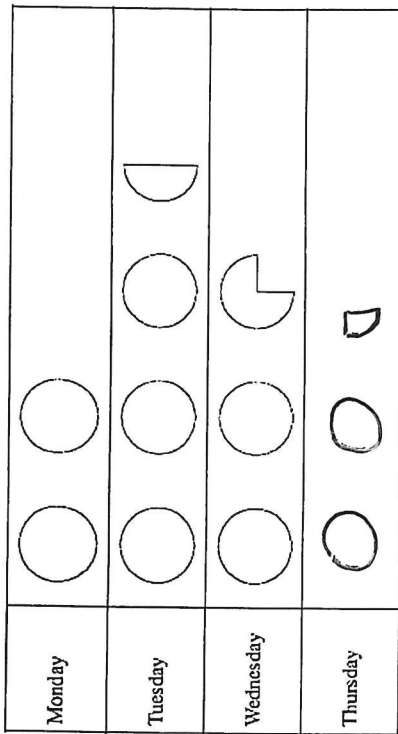


Maggie says: "the pie charts show that more year 11 students at school B study French"

(b) Is Maggie right?
 You must explain your answer

Maggie is wrong because total number of students in school B might be much lesser than of the number of students in A. Students taking French might be larger in number in school B, but not as much as students taking French in school A.

6 The pictogram shows the numbers of zips sold in a shop on Monday, on Tuesday and on Wednesday.



(a) Write down the number of zips sold on Monday.

8 (1)

(b) Write down the number of zips sold on Wednesday.

11 (1)

9 zips were sold on Thursday.

(c) Complete the pictogram.

(1)
 (3 marks)

17

$$\frac{4}{24} = \frac{1}{6}$$

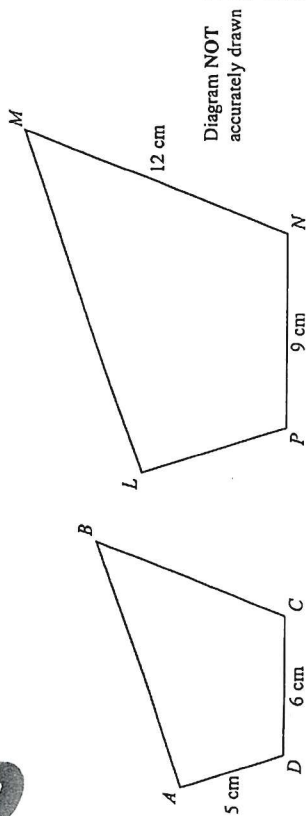
4
11
16

Angle $A = \text{angle } L$
 Angle $B = \text{angle } M$
 Angle $C = \text{angle } N$
 Angle $D = \text{angle } P$

Key: $\square = 4$ text messages

(Total 5 marks)

(Total for Question 17 is 4 marks)



Quadrilaterals $ABCD$ and $LMNP$ are mathematically similar.

Angle $A = \text{angle } L$
Angle $B = \text{angle } M$
Angle $C = \text{angle } N$
Angle $D = \text{angle } P$

(a) Work out the length of LP .

out the length of LP .
the ratio between sides = $\frac{9}{6} = 1.5$ (it's a scale factor)

$$LP = 5 \times 1.5 = 7.5 \text{ cm}$$

7.5 cm

(b) Work out the length of BC .

$$\frac{12}{15} = \frac{8}{10}$$



127

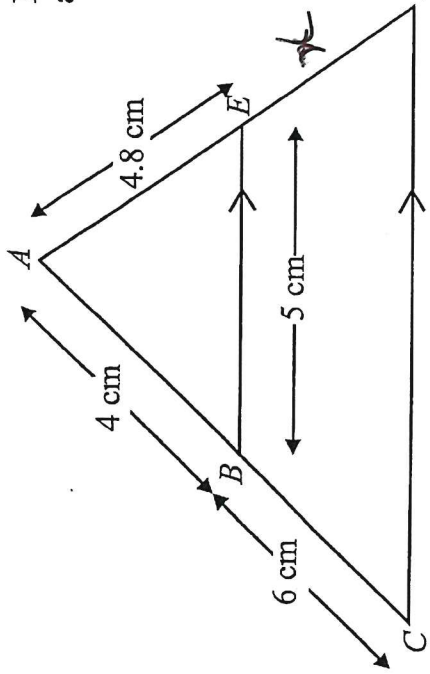


Diagram NOT accurately drawn

BE is parallel to CD.
ABC and AED are straight lines.

AB = 4 cm, BC = 6 cm, BE = 5 cm, AE = 4.8 cm.

Ratio of two corresponding sides of $\triangle ABE$ & $\triangle ACD$ is $10:4$ or scale factor = $\frac{10}{4} = 2.5$

(a) Calculate the length of CD.

$$CD = 5 \times 2.5 = 12.5$$

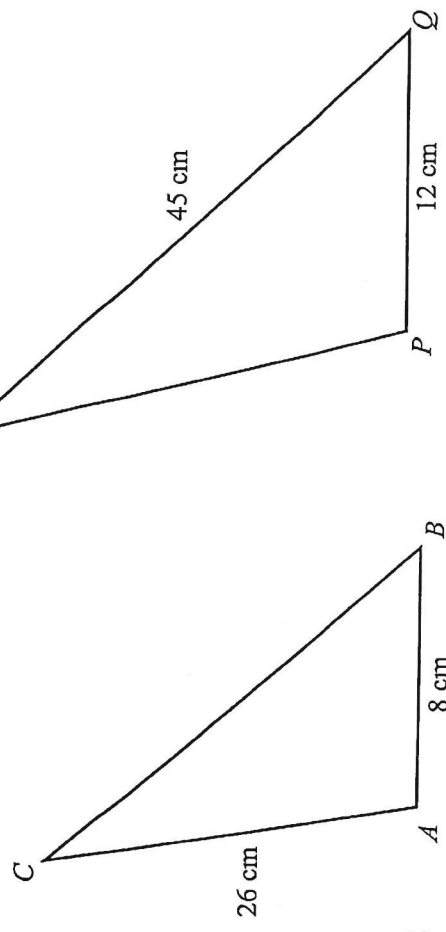
(b) Calculate the length of ED.

$$\frac{4.8 + x}{4.8} = 2.5$$

$$4.8 + x = 2.5 \times 4.8$$

$$x = 12 - 4.8$$

128



The two triangles ABC and PQR are mathematically similar.

Angle A = angle P.

Angle B = angle Q.

AB = 8 cm.

AC = 26 cm.

PQ = 12 cm.

QR = 45 cm.

$$\text{Scale factor } \frac{12}{8} = 1.5$$

(a) Calculate the length of PR.

$$PR = 26 \times 1.5 = 39$$

(b) Calculate the length of BC.

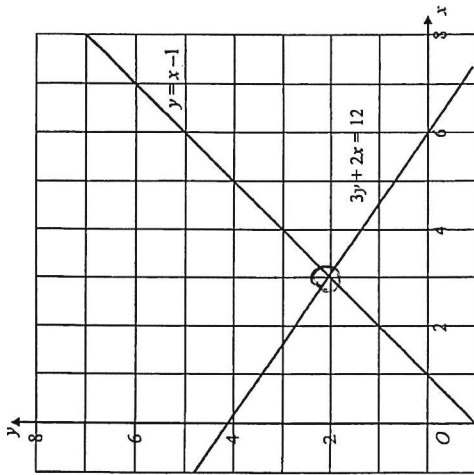
$$\frac{45}{1.5} = 30$$

$$39 \dots \text{cm (2)}$$

$$30 \dots \text{cm (2)}$$

124

1. The graphs of the straight lines with equations $3y + 2x = 12$ and $y = x - 1$ have been drawn on the grid.



Use the graphs to solve the simultaneous equations

$$\begin{aligned} 3y + 2x &= 12 \\ y &= x - 1 \end{aligned}$$

$$x = \underline{3}$$

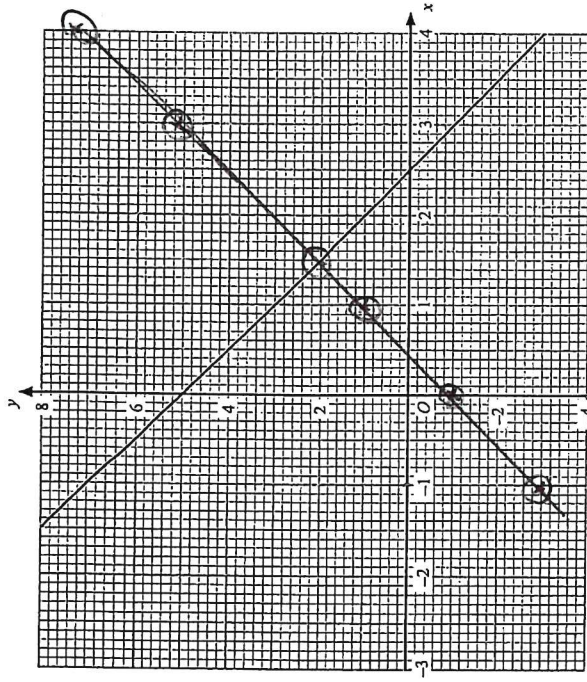
$$y = \underline{2}$$

(2)

(Total 2 marks)

130

2. The straight line $y + 2x = 5$ has been drawn on the grid.



(a) Complete this table of values for $y = 2x - 1$

x	-1	0	1	2	3	4
y	-3	-1	1	3	5	7

(2)

(b) On the grid, draw the graph of $y = 2x - 1$

(2)

(c) Use your diagram to solve the simultaneous equations

$$y + 2x = 5$$

$$y = 2x - 1$$

$$x = \underline{1.5}$$

$$y = \underline{2}$$

(2)

(Total 6 marks)

15 Solve the simultaneous equations

$$\begin{array}{l} 3x + 4y = 5 \rightarrow \textcircled{1} \\ 2x - 3y = 9 \rightarrow \textcircled{2} \end{array}$$

we eliminate
"y" first

Multiply $\textcircled{1}$ by 3 and $\textcircled{2}$ by 4

and then add

$$3 \times 3x + 4y = 5$$

$$4 \times 2x - 3y = 9$$

we get

$$9x + 12y = 15$$

$$8x - 12y = 36$$

$$17x = 51$$

$$x = \frac{51}{17} = 3$$

Put $x = 3$ in $\textcircled{1}$

$$3 \times 3 + 4y = 5$$

$$9 + 4y = 5$$

$$4y = 5 - 9$$

$$4y = -4$$

$$y = \frac{-4}{4} = -1$$

$$x = 3$$

$$y = -1$$

(Total for Question 15 is 4 marks)



P 4 3 3 8 3 A 0 1 7 2 8

18 Solve the simultaneous equations

$$\begin{array}{l} 4x + y = 25 \rightarrow \textcircled{1} \\ x - 3y = 16 \rightarrow \textcircled{2} \end{array}$$

Easy to eliminate
"y" here, first

Multiply $\textcircled{1}$ by 3 and then add $\textcircled{1}$ & $\textcircled{2}$

$$3 \times 4x + y = 25$$

we get

$$12x + 3y = 75$$

$$x - 3y = 16$$

$$13x = 91$$

$$x = \frac{91}{13} = 7$$

Put $x = 7$ in $\textcircled{1}$

$$4 \times 7 + y = 25$$

$$28 + y = 25$$

$$y = 25 - 28$$

$$y = -3$$

$$x = 7$$

$$y = -3$$

(Total for Question 18 is 3 marks)



P 4 4 0 2 2 A 0 2 0 2 8

15 A cinema sells adult tickets and child tickets.

The total cost of 3 adult tickets and 1 child ticket is £30

The total cost of 1 adult ticket and 3 child tickets is £22

Work out the cost of an adult ticket and the cost of a child ticket.

$$3a + c = 30 \quad \text{--- (1)}$$

$$a + 3c = 22 \quad \text{--- (2)}$$

$$3a + 9c = 66$$

$$- 3a + c = 30$$

$$8c = 36$$

$$c = \frac{36}{8} = £4.50$$

$$a + 3 \times 4.5 = 22$$

$$a + 13.5 = 22$$

$$a = 22 - 13.5$$

$$= 8.50$$

adult ticket £ 8.50

child ticket £ 4.50

(Total for Question 15 is 4 marks)



P 4 4 5 8 7 A 0 1 7 2 8

17
Turn over

9. (a) (i) Write 7900 in standard form.

$$7.9 \times 10^3$$

(ii) Write 0.00035 in standard form.

$$3.5 \times 10^{-4}$$

(b) Work out $\frac{4 \times 10^3}{8 \times 10^{-5}}$

Give your answer in standard form.

$$5 \times 10^7$$

10. (a) Write 30 000 000 in standard form.

$$3 \times 10^7$$

(b) Write 2×10^{-3} as an ordinary number.

$$0.002$$

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

$$0.00057$$

(b) Work out the value of $(7 \times 10^4) \times (3 \times 10^5)$

Give your answer in standard form.

$$2.1 \times 10^{10}$$

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

0.038×10^2 3800×10^{-4} 380 0.38×10^{-1}

0.38×10^{-1} , 3800×10^{-4} , 0.038×10^2 , 380

(2 marks)

The time taken for light to reach Earth from the edge of the known universe is 14 000 000 000 years.

Light travels at the speed of 9.46×10^{12} km/year.

Work out the distance, in kilometres, from the edge of the known universe to Earth.

Give your answer in standard form.

..... km
(3 marks)

The surface area of Earth is $510\,072\,000 \text{ km}^2$.

The surface area of Jupiter is $6.21795 \times 10^{10} \text{ km}^2$.

The surface area of Jupiter is greater than the surface area of Earth.

How many times greater?

Give your answer in standard form.

.....
(3 marks)

$$p^2 = \frac{x-y}{xy}$$

$$x = 8.5 \times 10^9$$

$$y = 4 \times 10^8$$

Find the value of p .

Give your answer in standard form correct to 2 significant figures.

$$p^2 = \frac{(8.5 \times 10^9) - (4 \times 10^8)}{(8.5 \times 10^9) \times (4 \times 10^8)}$$

$$p = \sqrt{2.382352941 \times 10^{-9}}$$

$$4.88 \times 10^{-5}$$

$$4.88 \times 10^{-5}$$

(4 marks)

$$y^2 = \frac{ab}{a+b}$$

$$a = 3 \times 10^8$$

$$b = 2 \times 10^7$$

Find y .

Give your answer in standard form correct to 2 significant figures.

$$y^2 = \frac{(3 \times 10^8) \times (2 \times 10^7)}{(3 \times 10^8) + (2 \times 10^7)}$$

$$y = \sqrt{18750000} = 433410^3$$

(4 marks)

17 (a) Write down the value of 10^0

1

(b) Write down the value of 10^{-2}

0.01

(c) Write these numbers in order of size.
Start with the smallest number.

2.73×10^3 27.3×10^{-3} 273×10^3 0.00273

$0.00273, 27.3 \times 10^{-3}, 2.73 \times 10^3, 273 \times 10^3$

(Total for Question 17 is 4 marks)



P 4 4 0 2 2 A 0 1 9 2 8

19

Turn over

19 (a) Write 7.8×10^{-4} as an ordinary number.

0.00078

(b) Write 95 600 000 as a number in standard form.

9.56×10^7

(Total for Question 19 is 2 marks)

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

A washing machine has a sale price of £464

By how much money is the normal price of the washing machine reduced?

$$\begin{aligned} 80\% &= 464 \\ 100\% &= \frac{464}{80} \times 100 = 580 \end{aligned}$$

$$580 - 464 = £116$$

£

116

(Total for Question 20 is 3 marks)

20



P 4 4 0 2 4 A 0 2 0 2 8

Here is a cuboid.

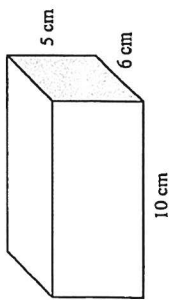


Diagram NOT accurately drawn

What is the total surface area of the cuboid?

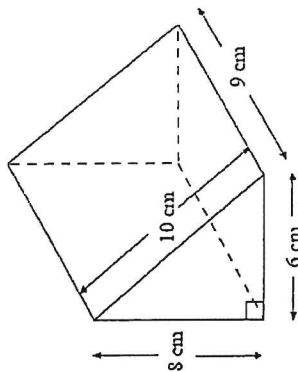
State the units with your answer.

$$A = 2 \times 10 \times 6 + 2 \times 10 \times 5 + 2 \times 5 \times 6$$

$$A = 280 \text{ cm}^2$$

(Total 4 marks)

Diagram NOT accurately drawn



Work out the surface area of the triangular prism.
State the units with your answer.

$$\text{Area} = 2 \times \frac{6 \times 8}{2} + 8 \times 9 + 6 \times 9 + 10 \times 9$$

$$\text{Area} = 264 \text{ cm}^2$$

(Total 4 marks)

Here is a triangular prism.

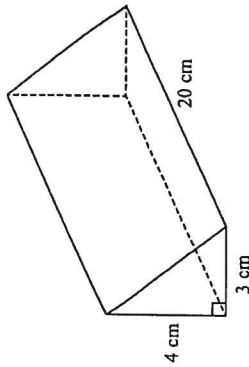


Diagram NOT accurately drawn

Work out the volume of this triangular prism.

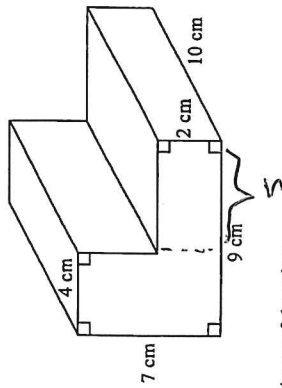
$$\text{Volume} = \frac{4 \times 3 \times 20}{2}$$

(Total for Question 3 is 4 marks)

120 cm³



The diagram shows a prism.



Work out the volume of the prism.

$$\begin{aligned} \text{Volume} &= \\ 4 \times 7 &= 28 \\ 5 \times 2 &= 10 \\ 28 + 10 &= 38 \text{ cm} \times 10 \end{aligned}$$

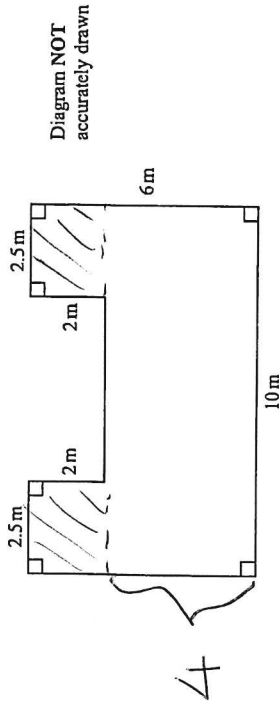
380

(Total for Question 9 is 3 marks)



P 4 0 6 7 3 A 0 1 0 2 8

The diagram shows the plan of a floor.



Angie is going to varnish the floor.

She needs 1 litre of varnish for 5 m^2 of floor.

There are 2.5 litres of varnish in each tin of varnish.

Angie has 3 tins of varnish.

Does she have enough varnish for all the floor?
You must show all your working.



$$2 \times 2.5 = 5 \times 2 = 10 \text{ m}^2$$

$$4 \times 10 = 40 \text{ m}^2$$

$$40 + 10 = 50 \text{ m}^2$$

$$1 \text{ tin} = 2.5 \text{ litres}, 3 \text{ tins} = 7.5 \text{ litres}$$

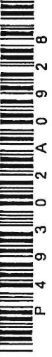
$$1 \text{ litre} = 5 \text{ m}^2$$

$$10 \text{ litres} = 50 \text{ m}^2$$

Angie needs 10 litres of varnish,
she only has 7.5 litres.

(Total for Question 7 is 5 marks)

Turn over



P 4 9 3 0 2 A 0 9 2 8

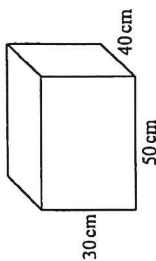
9 The diagram shows a container for oil.
The container is in the shape of a cuboid.
The container is empty.

Sally has to fill the container with oil.
A bottle of oil costs £3.50
There are 3000 cm³ of oil in each bottle.

Sally must not spend more than £60 buying the oil.

Can Sally buy enough oil to fill the container?
You must show all your working.

Diagram NOT
accurately drawn



$$30 \times 50 \times 40 = 60000 \text{ cm}^3$$

$$\frac{60000}{3000} = 20 \text{ bottles.}$$

$$20 \times 3.50 = £70$$

No she cannot buy enough
oil.

(Total for Question 9 is 4 marks)



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

You must NOT use a calculator.

1 The diagram shows a prism.

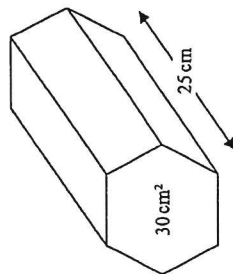


Diagram NOT
accurately drawn

The area of the cross section of the prism is 30 cm².
The length of the prism is 25 cm.

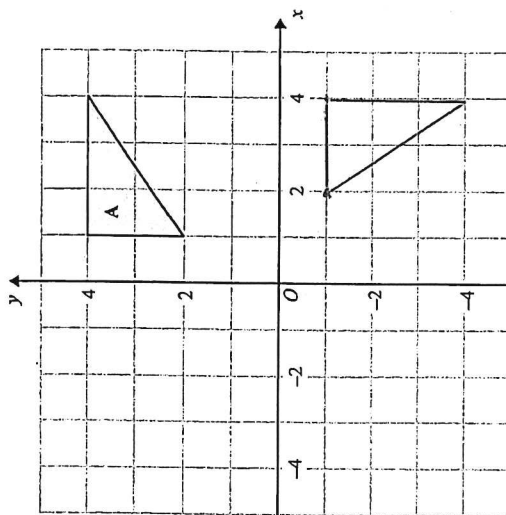
Work out the volume of the prism.

$$30 \times 25 = 750 \text{ cm}^3$$

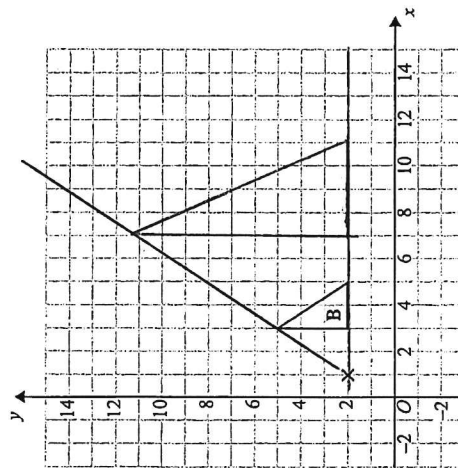
(Total for Question 1 is 3 marks)



151



(a) Rotate triangle A 90° clockwise, centre O.



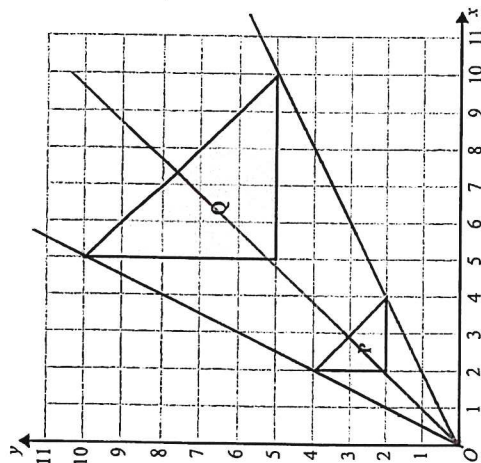
(b) Enlarge triangle B by scale factor 3, centre (1, 2).

(Total for Question 8 is 5 marks)



P 4 0 6 4 7 A 0 1 0 2 4

152

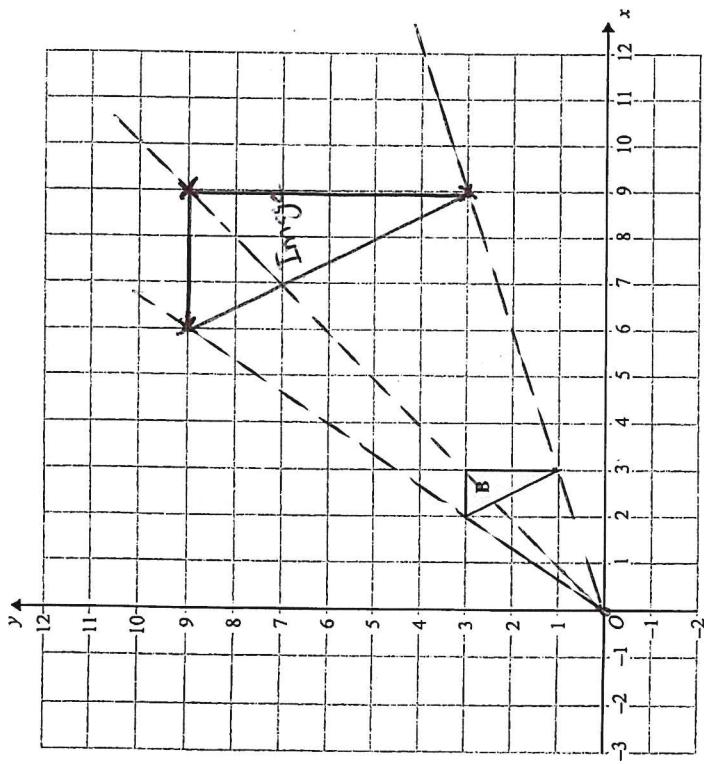


Describe fully the single transformation that maps shape P onto shape Q.
 Enlargement about (0,0) scale factor $2\frac{1}{2}$

(Total for Question 6 is 3 marks)

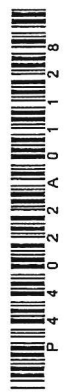


153

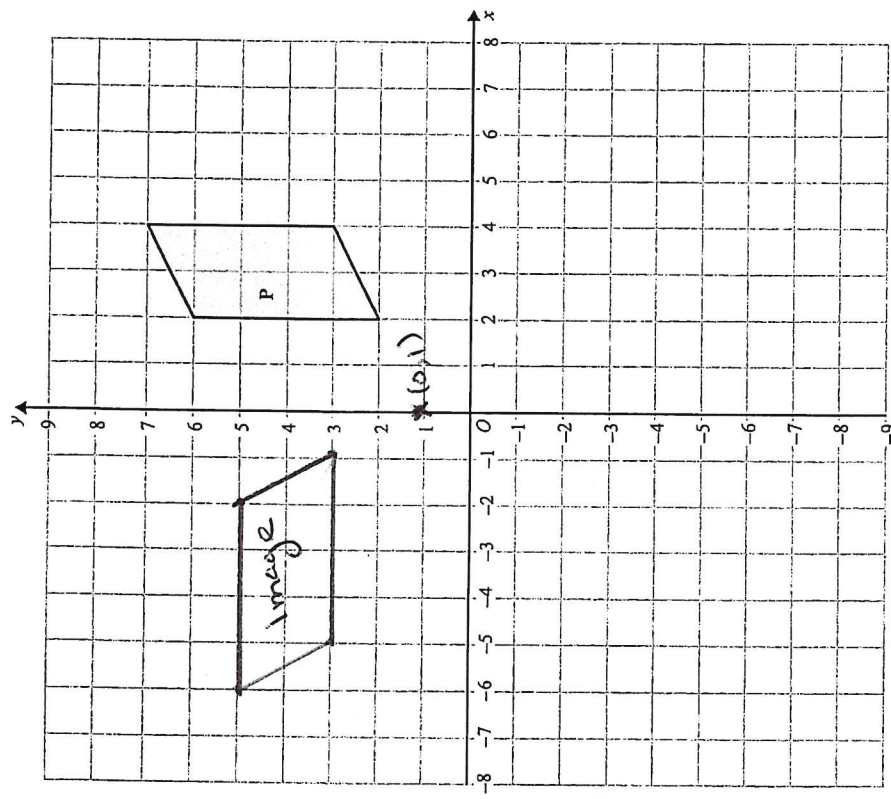


(b) On the grid, enlarge triangle B by scale factor 3, centre (0, 0).

(Total for Question 9 is 4 marks)



154

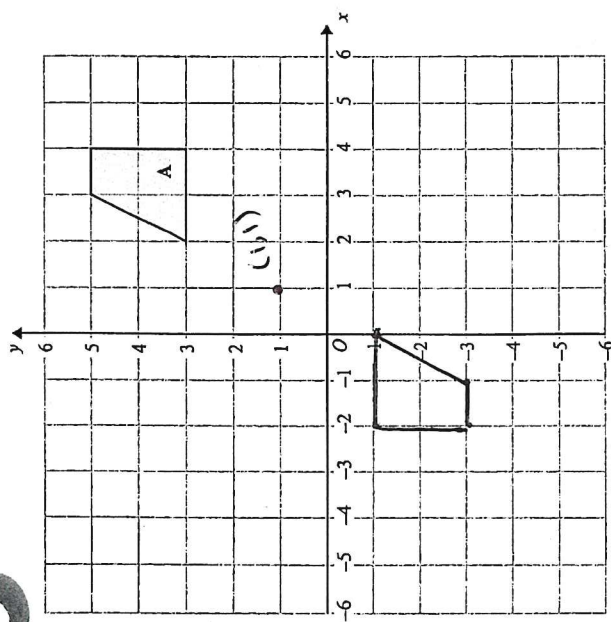


(b) Rotate shape P 90° anticlockwise about (0, 1).

(Total for Question 2 is 4 marks)



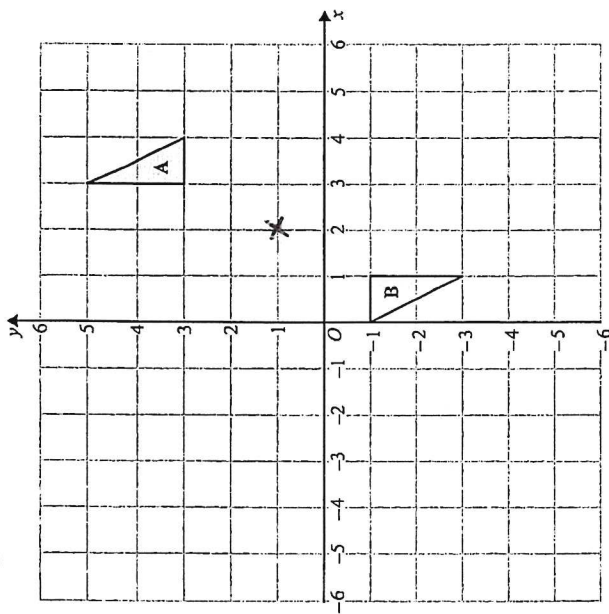
155



(a) On the grid, rotate shape A 180° about the point (1, 1).



156



Describe fully the single transformation that maps triangle A onto triangle B.

It is rotation of 180° about the point (2, 1)

(Total for Question 12 is 3 marks)

Turn over



157

- (a) Use your calculator to work out $\frac{\sqrt{2.5^2 + 3.75}}{3.9 - 1.7}$

$$= \frac{3.16227766}{2.2}$$

Write down all the figures on your calculator display.
You must give your answer as a decimal.

1.437398936

- (b) Write your answer to part (a) correct to 2 decimal places.

1.44

(1)
(4 marks)

- (a) Use your calculator to work out $\frac{38.5 \times 14.2}{18.4 - 5.9}$.

Write down all the figures on your calculator display.
You must give your answer as a decimal.

$$\frac{546.7}{12.5}$$

43.736

(2)

- (b) Write your answer to part (a) correct to 1 significant figure.

40

(1)
(3 marks)

- 18 Solve the simultaneous equations

$$\begin{array}{l} 3x \\ 4x \end{array} \quad \begin{array}{l} 4x + 7y = 1 \\ 3x + 10y = 15 \end{array}$$

① → ②

Multiply ① by 3 and ② by 4 and subtract

$$12x + 21y = 3$$

$$12x + 40y = 60$$

$$-19y = -57$$

$$y = \frac{-57}{-19} = 3$$

$$y = 3$$

$$\text{put } y = 3 \text{ in } ①$$

$$4x + 7 \times 3 = 1$$

$$4x + 21 = 1$$

$$4x = 1 - 21$$

$$4x = -20$$

$$x = -5$$

$$x = -5$$

$$y = 3$$

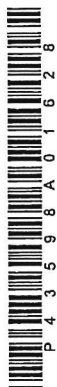
(Total for Question 18 is 4 marks)

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

5⁻⁴ 0.5 -5 5⁰
0.2
Answers, 0.2, -5, -5, 1

-5, 5, 0.5, 5

(Total for Question 19 is 2 marks)



Use your calculator to work out

$$\sqrt{\frac{920 - 170 \tan 65^\circ}{0.012 + 0.034}}$$

- (a) Write down all the figures on your calculator display.
You must write your answer as a decimal.

$$\sqrt{555.4338235}$$

$$0.046$$

$$512.3400776$$

- (b) Give your answer to part (a) correct to 3 significant figures.

$$512$$

- (a) Write down the reciprocal of 5

$$\frac{1}{5}$$

- (b) Evaluate 3^{-2}

$$\frac{1}{3^2} = \frac{1}{9}$$

- (c) Calculate $9 \times 10^4 \times 3 \times 10^3$
Give your answer in standard form.

$$27 \times 10^7$$

$$2.7 \times 10^8$$

(Total for Question 14 is 4 marks)

- 18 (a) Work out $1\frac{1}{5} \times 2\frac{1}{3}$

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

$$2\frac{6}{5} \times \frac{7}{3} = \frac{14}{5} = 2\frac{4}{5}$$

- (b) Work out $2\frac{7}{15} - 1\frac{2}{3}$

$$\frac{37}{15} - \frac{5 \times 5}{3 \times 5} = \frac{37}{15} - \frac{25}{15} = \frac{12}{15} \div 3 = \frac{4}{5}$$

(Total for Question 18 is 6 marks)



Venn Diagrams

A collection of 9-1 Maths GCSE Sample and Specimen questions from AQA, OCR, Pearson-Edexcel and WJEC Eduqas.

- (a) Use your calculator to work out $\frac{\sqrt{19.2 + 2.6^2}}{2.7 \times 1.5}$

Write down all the figures on your calculator display.

$$\frac{5.095095681}{4.05}$$

$$1.258048316$$

- (b) Write your answer to part (a) correct to 3 significant figures.

$$1.26$$

12. Calculate the value of $\sqrt{\frac{\tan 60^\circ + 1}{\tan 60^\circ - 1}}$

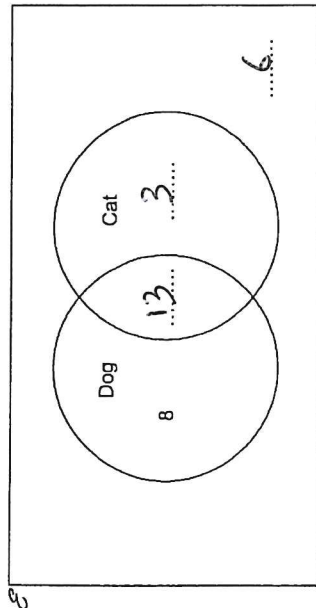
Write down all the figures on your calculator display.
You must give your answer as a decimal.

$$\frac{2.732050808}{0.732050807}$$

$$\frac{3.732050811}{= 3.7} \text{ (1 decimal place)}$$

Name:	
Total Marks:	

Here is a Venn diagram.



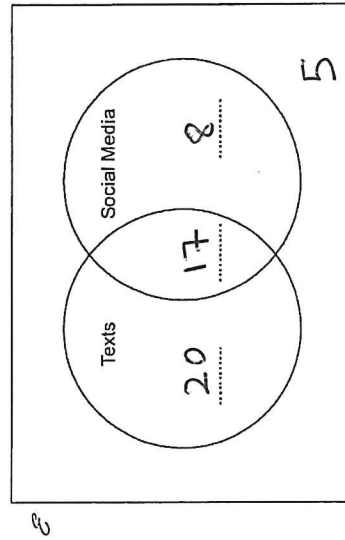
30 students are asked if they have a dog or cat.

- 21 have a dog.
- 16 have a cat.
- 8 have a dog, but not a cat.

Complete the Venn diagram.

[3]

50 students were asked in a survey whether they use texts or social media.



- 20 students said they only use texts.
- 8 students said they only use social media.
- 17 students said they use both texts and social media.

(a) Put this information on the Venn diagram.

[1]

(b) How many of the students in the survey do not use texts or social media?

(b)5..... [2]

(c) One of the students in the survey is chosen at random.

What is the probability that this student uses texts?

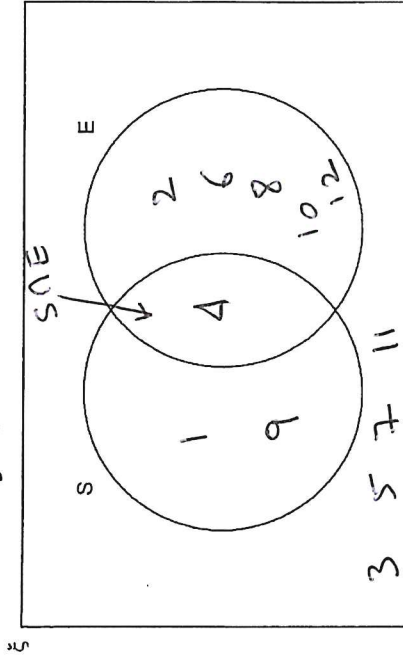
(c) $\frac{37}{50}$ [2]

3. $\xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

S = square numbers = 1, 4, 9

E = even numbers = 2, 4, 6, 8, 10, 12

(a) Complete the Venn diagram.



[3]

(b) One of the numbers is chosen at random.

Write down $P(S \cap E)$

[1]

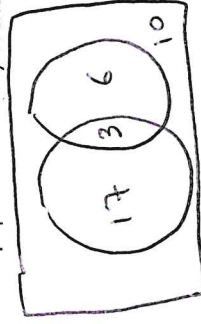
$$\frac{1}{12}$$

4. Last year, there were 36 pupils in a class.

Of these pupils, 20 studied French, 9 studied German and 3 studied both French and German.

A pupil was chosen at random from the class.

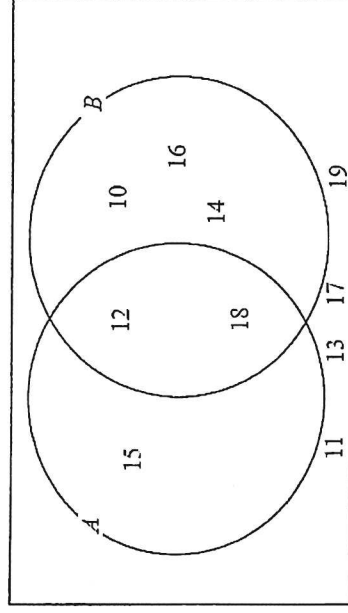
Find the probability that the pupil did not study French or German.



$$\text{Probability} = \frac{10}{36} = \frac{5}{18}$$

[4]

5. Here is a Venn diagram.



(a) Write down the numbers that are in set

(i) $A \cup B$

.....10, 12, 14, 15, 16, 18.....

(ii) $A \cap B$

.....12, 14.....

[2]

One of the numbers in the diagram is chosen at random.

(b) Find the probability that the number is in set A'

$$\frac{7}{10}$$

[2]



$\xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

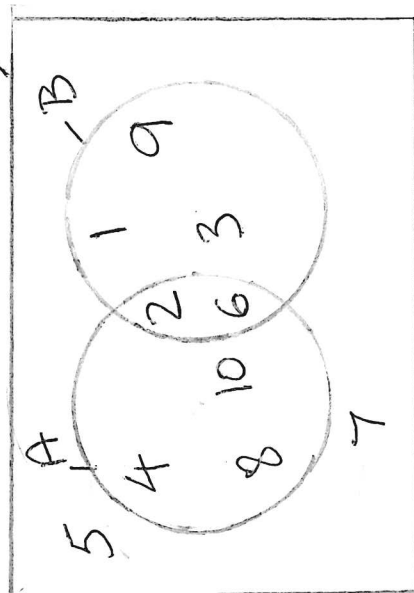
$A = \{\text{multiples of 2}\}$

$A \cap B = \{2, 6\}$

$A \cup B = \{1, 2, 3, 4, 6, 8, 9, 10\}$

Draw a Venn diagram for this information.

Re



[4]