Pearson

WEEK 4 TASKS

(Higher 4-6)

Don’t assume that questions with more marks are more difficult. Multi-mark questions are usually designed to enable all students to gain some marks even if they sometimes are not able to finish them. The important thing is to attempt every question. Sometimes once you have made a start the maths that is required will reveal itself and underlining key words may help.

Remember: have a go at every question!

WEEK 4 TASK 1

Estimated completion time = 30 minutes.

Answer all questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

***1** Write down the value of 5^{-2}

.....

(Total for Question 1 is 1 mark)

***2** The mean length of 5 sticks is 4.2 cm.
Nawal measured the length of one of the sticks as 7 cm.
(*a*) Work out the mean length of the other 4 sticks.

..... cm

(3)

Nawal made a mistake.
The stick was not 7 cm long.
It was 17 cm long.
(*b*) How does this affect your answer to part (*a*)?

.....

.....

.....

(1)

(Total for Question 2 is 4 marks)

---

3 Work out the value of $27^{\frac{2}{3}} + \left(\frac{1}{2}\right)^{-3}$

.....

(Total for Question 3 is 3 marks)

***4** Mano has three shelves of books.
There are x books on shelf **A**.

There are $(3x + 1)$ books on shelf **B**.
There are $(2x - 5)$ books on shelf **C**.
There is a total of 44 books on the three shelves.

All the books have the same mass.
The books on shelf **B** have a total mass of 7500 g.

Work out the total mass of the books on shelf **A**.

..... g

(Total for Question 4 is 5 marks)

***5** A cube has a total surface area of 150 cm^2
Work out the volume of the cube.

..... cm^3

(Total for Question 5 is 4 marks)

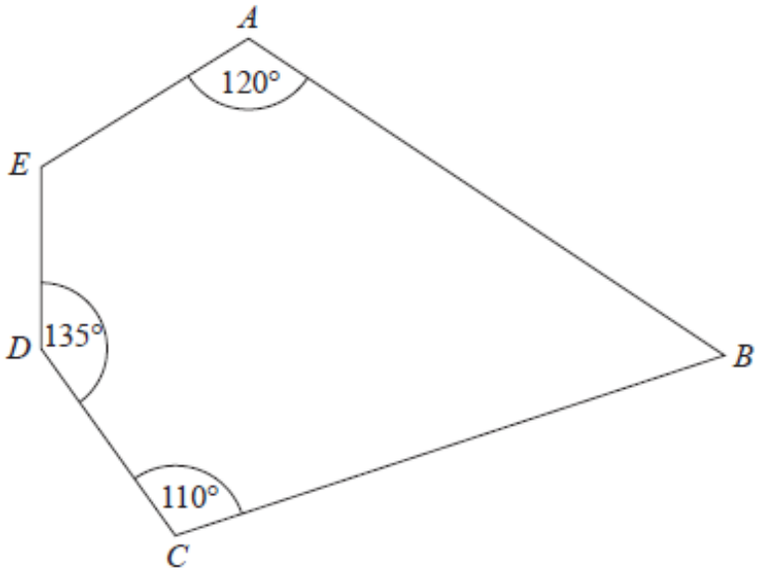
---

6 y is directly proportional to x.
$y = 24$ when $x = 1.5$
Work out the value of y when $x = 5$

$y =$ .....

(Total for Question 6 is 3 marks)

7 Here is a pentagon.



Angle $AED = 4 \times$ angle ABC

Work out the size of angle AED.
You must show all your working.

.....°

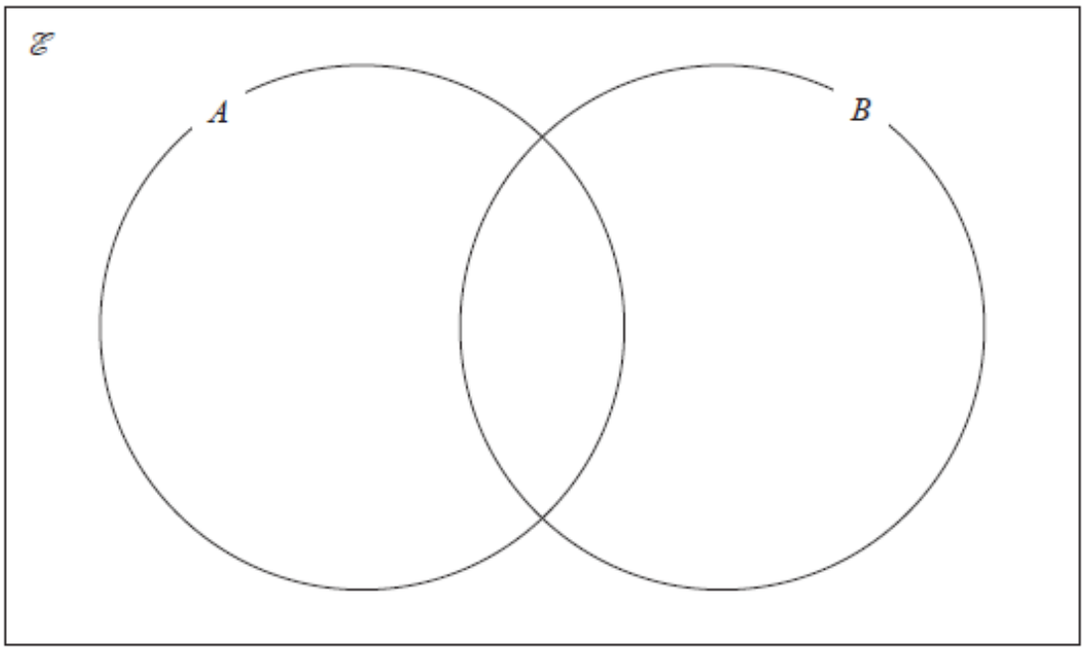
(Total for Question 7 is 4 marks)

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

$A = \{\text{odd numbers}\}$

$B = \{\text{square numbers}\}$

(*a*) Complete the Venn diagram for this information.



(3)

A number is chosen at random from the universal set $\mathscr{E}$

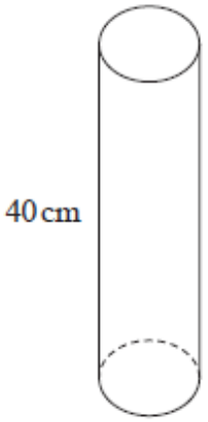
(*b*) Find the probability that this number is in the set B'

.....

(2)

(Total for Question 8 is 5 marks)

***9** The diagram shows a solid cylinder on a horizontal floor.



$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The cylinder has a

volume of 1200 cm^3

height of 40 cm.

The cylinder exerts a force of 90 newtons on the floor.

Work out the pressure on the floor due to the cylinder.

..... newtons/cm^2

(Total for Question 9 is 3 marks)

TOTAL FOR PAPER IS 32 MARKS

WEEK 4 TASK 2

Estimated completion time = 45 minutes.

Answer ALL TWENTY ONE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Solve $3(2 - 4x) = 5 - 8x$

Show clear algebraic working.

$x =$ .....

(Total for Question 1 is 3 marks)

---

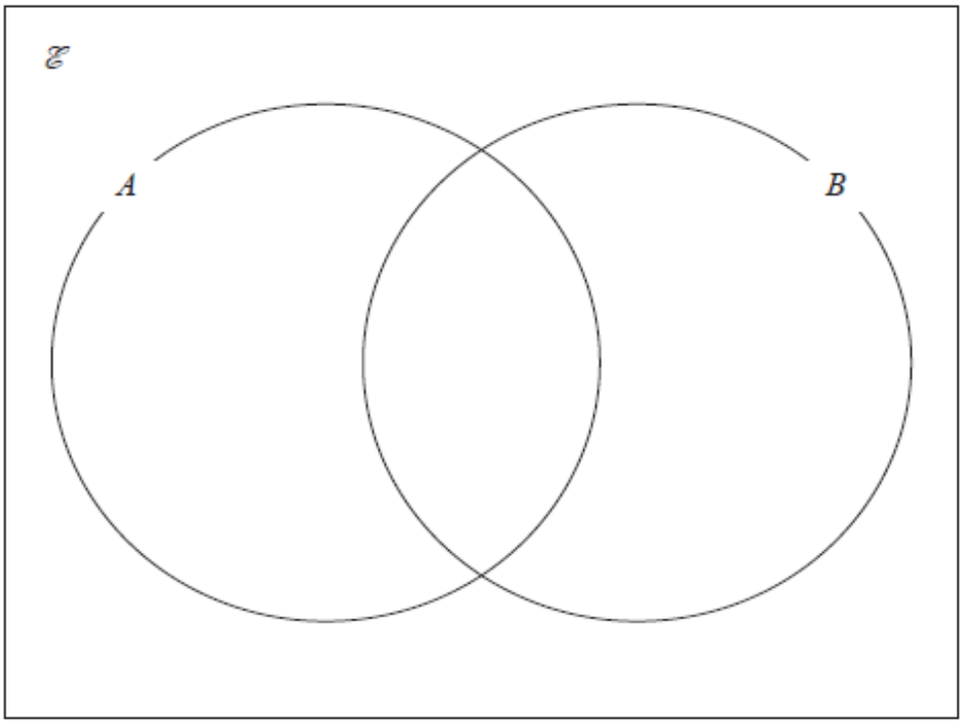
2 $\mathscr{E} = \{11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

$A = \{\text{even numbers}\}$

$A \cap B = \{12, 16, 20\}$

$(A \cup B)' = \{17, 19\}$

Complete the Venn diagram for the sets $\mathscr{E}$, A and B



(Total for Question 2 is 3 marks)

3 Solve the simultaneous equations

$$5x + 4y = -2$$
$$2x - y = 4.4$$

Show clear algebraic working.

$x =$ .....

$y =$ .....

(Total for Question 3 is 3 marks)

4 $3^{\frac{1}{2}} \times 3^{\frac{2}{5}} = 3^m$

(*a*) Work out the value of *m*

m = ...

(1)

$5^{-10} \div 5^{-4} = 5^n$

(*b*) Work out the value of *n*

n = ...

(1)

(Total for Question 4 is 2 marks)

5 Here are 9 cards. Each card has either a number on it or a letter on it.

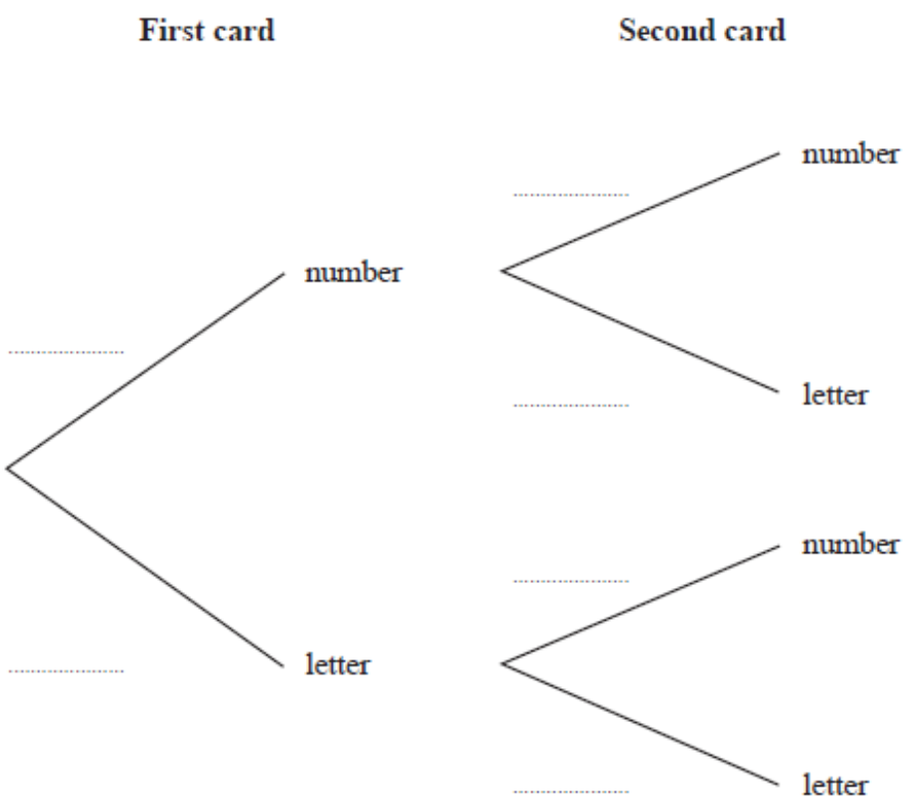
A	7	H	F	E	D	G	5	C

Tomas is playing a game.

Tomas takes at random one of the cards and keeps it.

Tomas then takes at random another card and keeps it.

(*a*) Complete the probability tree diagram.



(2)

(*b*) Work out the probability that each of the two cards has a number on it.

.....

(2)

(*c*) Work out the probability that there will be one card with a number on it and one card with a letter on it.

.....

(3)

(Total for Question 5 is 7 marks)

6 Show that $3\frac{5}{7} \div 1\frac{5}{8} = 2\frac{2}{7}$

(Total for Question 6 is 3 marks)

7 (*a*) Write down the value of $(m + 2)^0$ where m is a positive integer.

.....

(1)

(*b*) Simplify $(3a^2b^4)^3$

.....

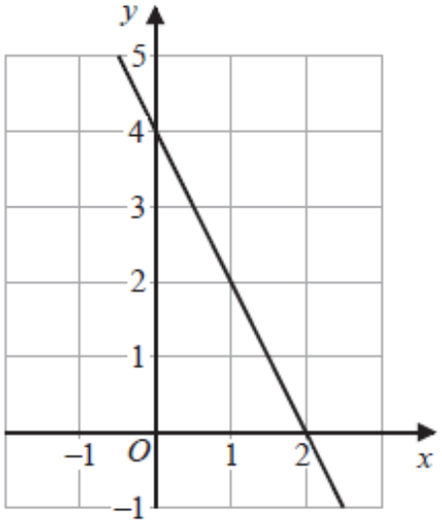
(2)

(*c*) Factorise fully $14x^2y^4 + 21x^3y^2$

.....

(2)

The diagram shows a straight line drawn on a grid.



(*d*) Write down an equation of the line.

.....

(2)

(Total for Question 7 is 7 marks)

8 The diagram shows an isosceles triangle, with base length 24 cm.

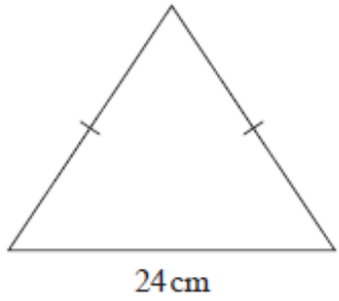


Diagram **NOT** accurately drawn

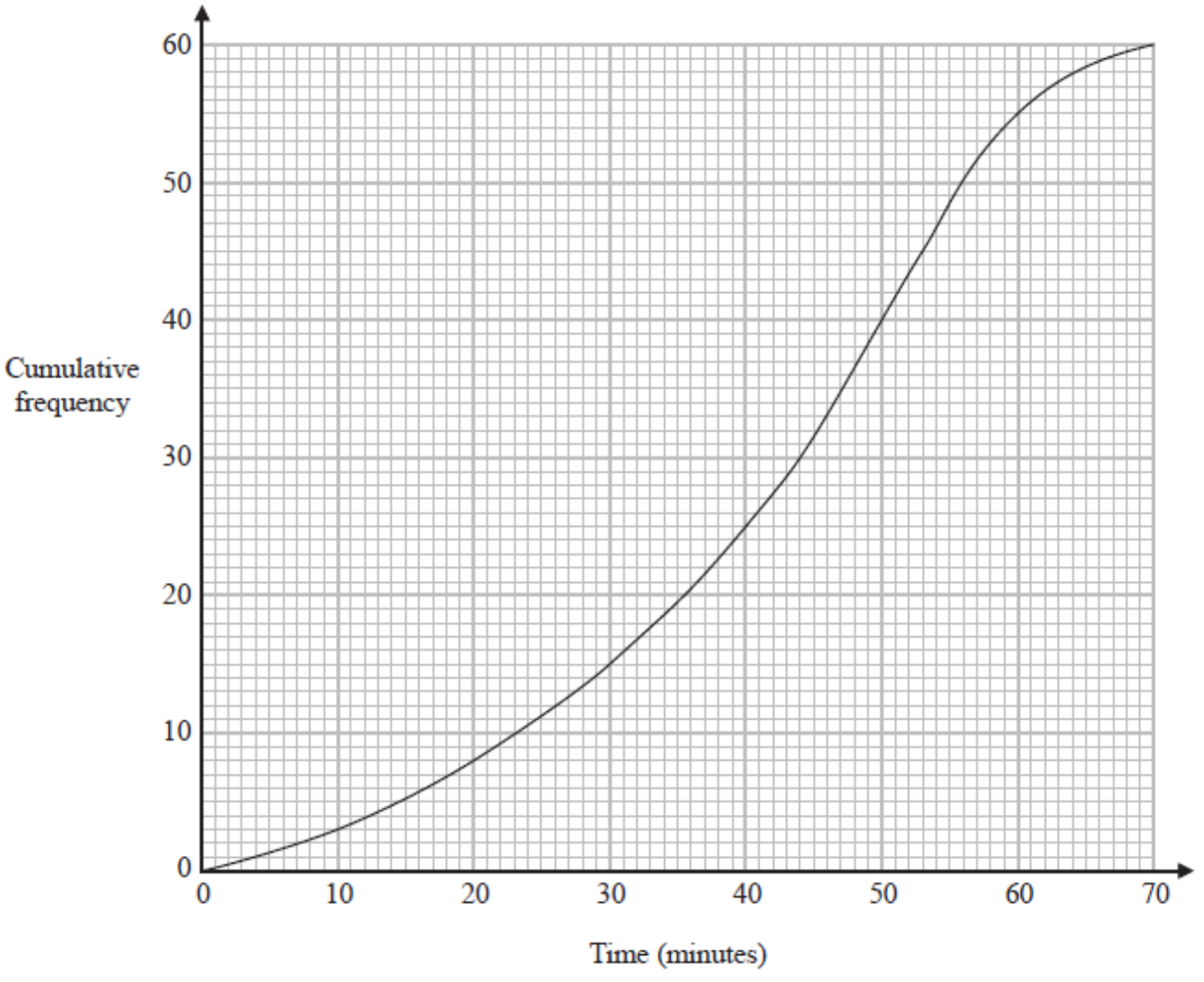
The perimeter of the triangle is 54 cm.

Work out the area of the triangle.

..... cm^2

(Total for Question 8 is 5 marks)

9 The cumulative frequency graph gives information about the time, in minutes, each of 60 people took to shop in a market.



(*a*) Use the graph to find an estimate for the median time people took to shop in the market.

..... minutes

(1)

(*b*) Use the graph to find an estimate for the number of people who took longer than 55 minutes to shop in the market.

.....

(2)

(*c*) Use the graph to complete the frequency table to give information about the time, in minutes, each of the 60 people took to shop in the market.

Time taken to shop in the market (*m* minutes)	**Frequency**
$0 < m \leq 10$	3
$10 < m \leq 20$	5
$20 < m \leq 30$	
$30 < m \leq 40$	
$40 < m \leq 50$	
$50 < m \leq 60$	
$60 < m \leq 70$	

(2)

(Total for Question 9 is 5 marks)

---

10 Expand and simplify $3x(2x - 5)^2$

Show clear algebraic working.

.....

(Total for Question 10 is 3 marks)

TOTAL FOR PAPER IS 41 MARKS

WEEK 4 TASK 3

Estimated completion time = 30 minutes.

Answer all questions.

Write your answers in the spaces provided.

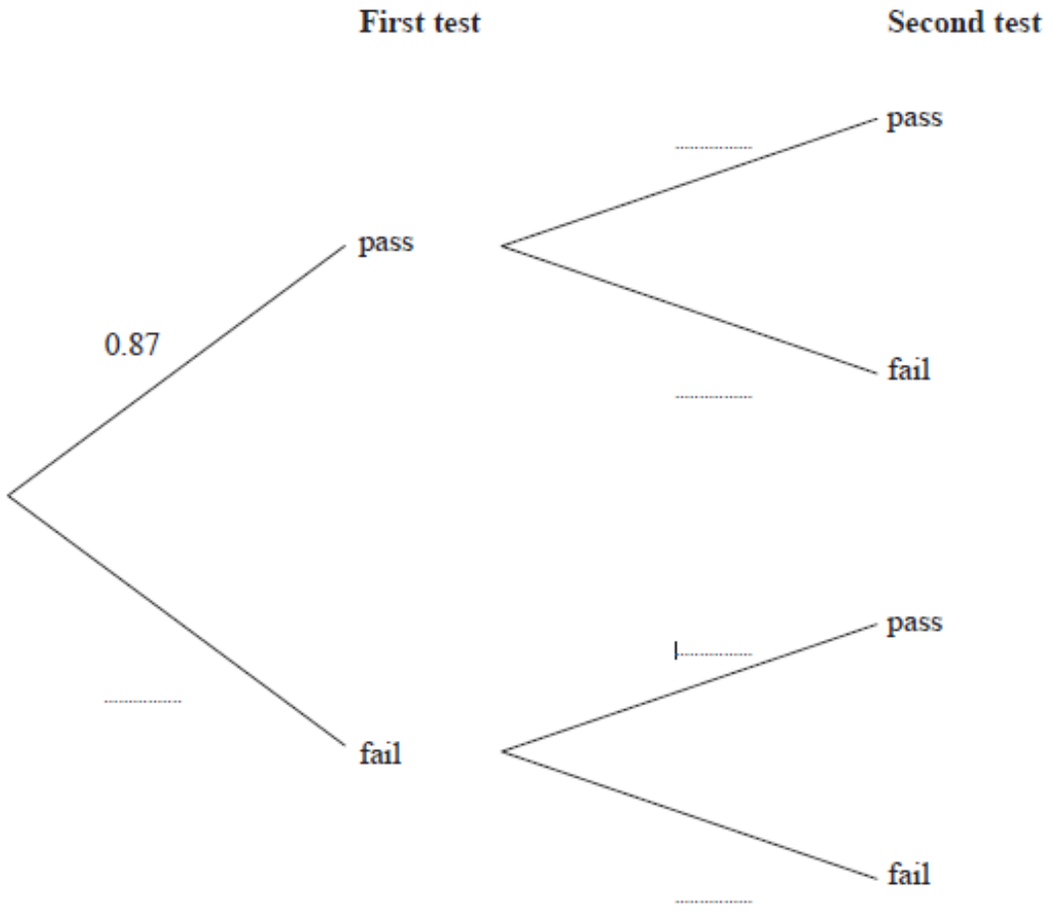
You must write down all the stages in your working.

1 Shakir has to complete two tests.

He can either pass or fail each test.
The probability that he will pass the first test is 0.87

If he passes the first test the probability he will pass the second test is 0.94
If he fails the first test the probability he will pass the second test is 0.73

(*a*) Complete the probability tree diagram for this information.



(2)

(*b*) Work out the probability that Shakir passes at least one of the tests.

.....

(3)

(Total for Question 1 is 5 marks)

***2** A number, d, is rounded to 1 decimal place.
The result is 12.7

Complete the error interval for d.

..... $\leq d <$ .....

(Total for Question 2 is 2 marks)

---

3 A number x is written correct to 2 significant figures.
The result is 1.9
Complete the error interval for x.

..... $\leq x <$ .....

(Total for Question 3 is 2 marks)

---

4 Expand and simplify $(x + 7)(x – 2)(x + 3)$

.....

(Total for Question 4 is 3 marks)

5 Use algebra to solve the simultaneous equations

$$2x + 6y = 5$$
$$3x - 4y = -12$$

$x =$ .....

$y =$ .....

(Total for Question 5 is 4 marks)

***6** $-2 \leq n < 5$

n is an integer.

(*a*) Write down the greatest possible value of n.

.....

(1)

(*b*) Solve $\frac{2}{5}g - 4 < 6$

.....

(3)

(Total for Question 6 is 4 marks)

7 Show that the equation $x^4 - x^2 - 5 = 0$ can be written in the form $x = \sqrt[4]{x^2 + 5}$

(Total for Question 7 is 1 mark)

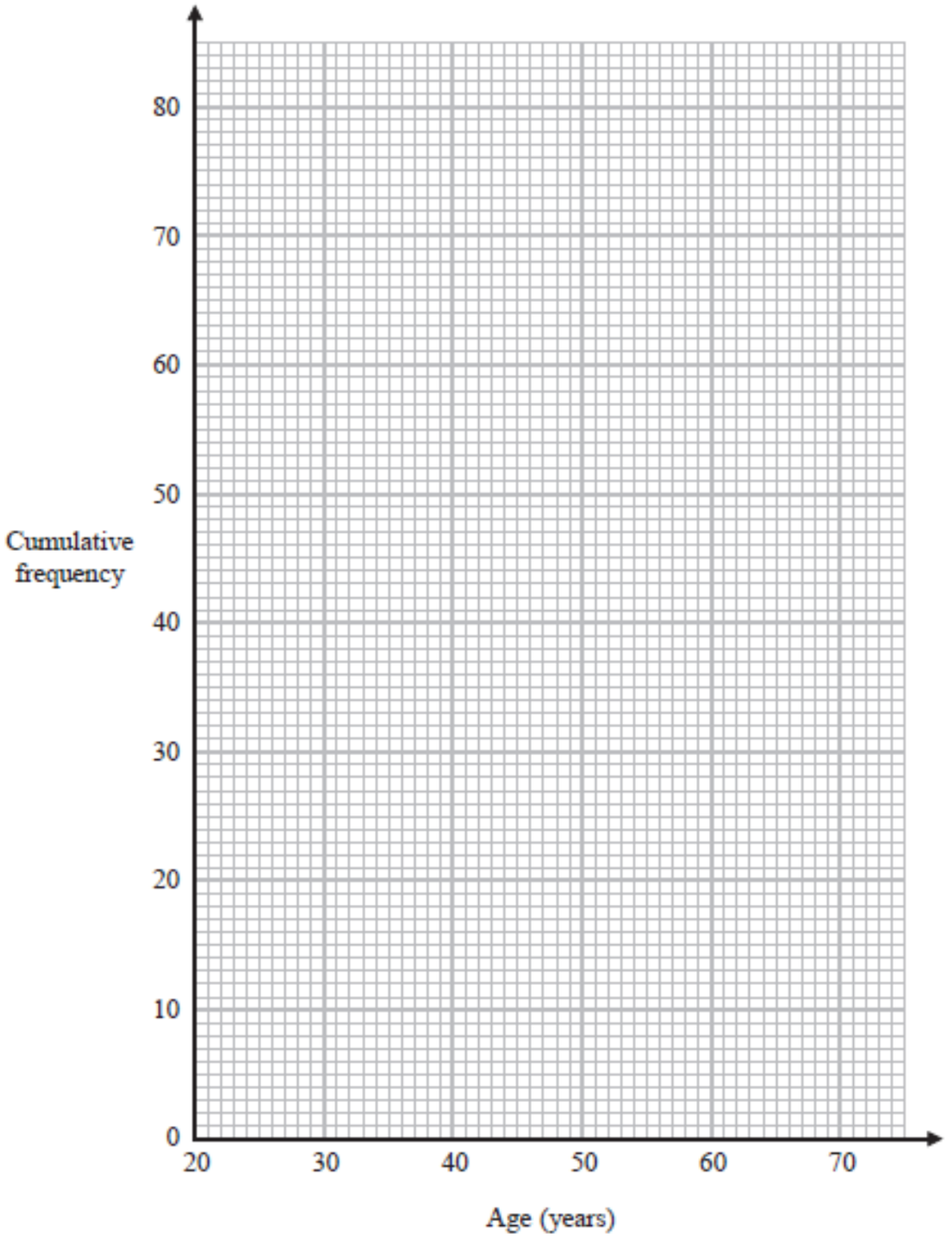
---

8 The cumulative frequency table gives information about the ages of 80 people working for a company.

Age (a years)	**Cumulative frequency**
$20 < a \leq 30$	20
$20 < a \leq 40$	48
$20 < a \leq 50$	64
$20 < a \leq 60$	75
$20 < a \leq 70$	80

On the grid on the next page, draw a cumulative frequency graph for this information.

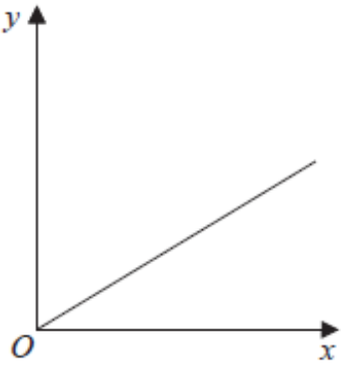
(2)



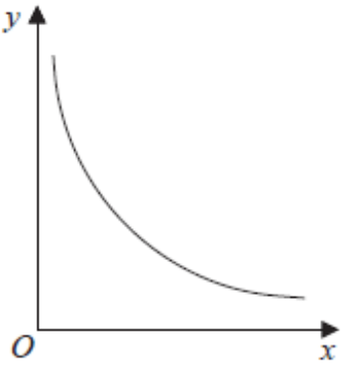
(Total for Question 8 is 2 marks)

9

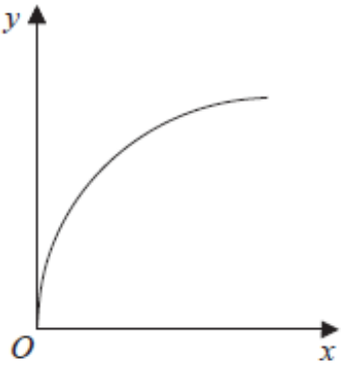
Graph A



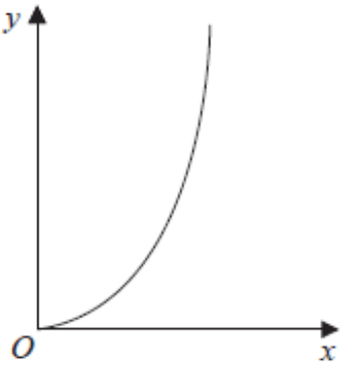
Graph B



Graph C



Graph D



The graphs of y against x represent four different types of proportionality.
Match each type of proportionality in the table to the correct graph.

Type of proportionality	**Graph**
$y \propto x^2$	
$y \propto x$	
$y \propto \frac{1}{x}$	
$y \propto \sqrt{x}$	

(Total for Question 9 is 2 marks)

10 The functions f and g are such that

$$f(x) = (2x + 3)^2 \quad \text{and} \quad g(x) = 2x - 1$$

Find gf(−3)

.....

(Total for Question 10 is 2 marks)

***11** Chris, Debbie and Errol share some money in the ratio 3 : 4 : 2
Debbie gets £120
Chris then gives some of his share to Debbie and some of his share to Errol.
The money that Chris, Debbie and Errol each have is now in the ratio 2 : 5 : 3
How much money did Chris give to Errol?

£.....

(Total for Question 11 is 4 marks)

TOTAL FOR PAPER IS 31 MARKS

WEEK 4 TASK 4

Estimated completion time = 45 minutes.

Answer ALL TWENTY ONE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (*a*) Write 6.25×10^{-4} as an ordinary number.

.....

(1)

(*b*) Work out $(2.4 \times 10^{12}) \div (9.6 \times 10^{4})$
Give your answer in standard form.

.....

(2)

(Total for Question 1 is 3 marks)

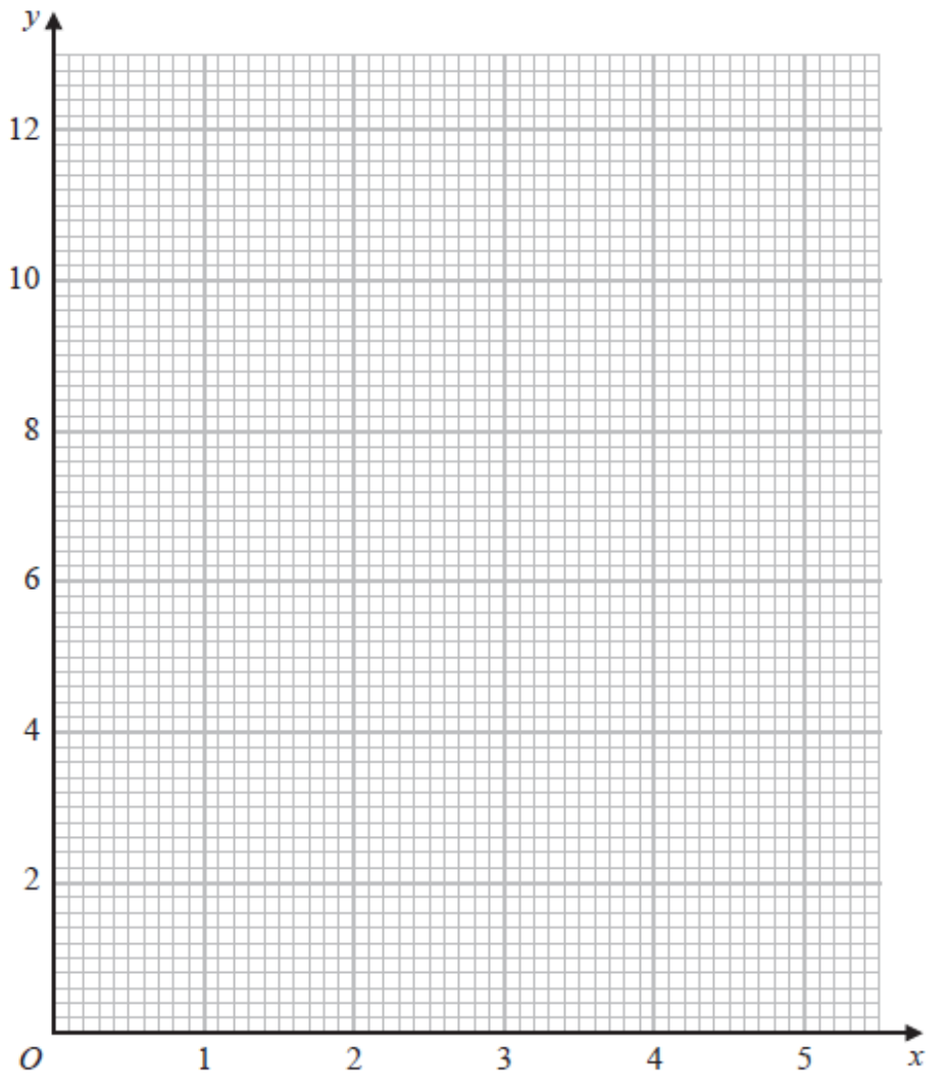
---

2 (*a*) Complete the table of values for $y = \frac{2}{x}\left(5 - \frac{1}{x}\right)$

x	0.5	1	2	3	4	5
y	12			3.1	2.4	1.9

(1)

(*b*) On the grid, draw the graph of $y = \frac{2}{x}\left(5 - \frac{1}{x}\right)$ for $0.5 \leq x \leq 5$



(2)

(Total for Question 2 is 3 marks)

3 The diagram shows a pentagon.

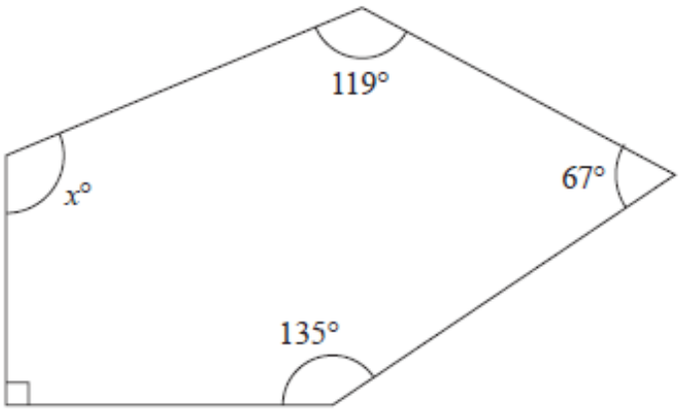


Diagram **NOT** accurately drawn

Work out the value of x

x = ...

(Total for Question 3 is 3 marks)

4 Some members of a library were asked to name the type of book that they each liked to read the best.

One of the members is chosen at random.
The table shows information about the probability of the type of book that this member answered.

Type of book	comedy	romance	mystery	thriller
Probability	0.24	0.40	$3x$	x

48 members answered comedy books.

Work out how many of the members answered mystery books.

.....

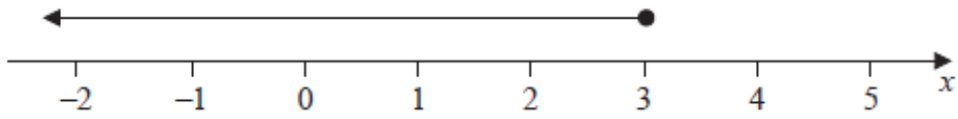
(Total for Question 4 is 4 marks)

5 (*a*) Factorise $y^2 - 2y - 48$

.....

(2)

(*b*) Write down the inequality shown on the number line



.....

(1)

(*c*) Solve the inequality $7w + 6 > 12w + 14$

.....

(3)

(Total for Question 5 is 6 marks)

6 Matteo is going to invest £5000 for two years.

He can invest his money in Bank **G** or in Bank **H**.

Bank G	Bank H
1.6% per year compound interest	2.9% interest added after two years

The total amount of interest Matteo would receive at the end of two years from Bank **G** is more than the amount of interest Matteo would receive at the end of two years from Bank **H**.

How much more?

£.....

(Total for Question 6 is 4 marks)

7 Shane bought a car.

The amount Shane paid for the car was £32 000

Theresa also bought a car. To pay for this car, Theresa paid a deposit of £18 000 together with 14 monthly payments of £1160

Theresa paid more for her car than Shane paid for his car.

(*a*) Work out how much more Theresa paid as a percentage of the amount Shane paid.

.....%

(4)

Kylie bought a van.

After 1 year, the value of the van was £39 865
During this year, the value of the van decreased by 15%

(*b*) Work out the value of the van when Kylie bought it.

£.....

(3)

(Total for Question 7 is 7 marks)

8 Change a speed of 90 kilometres per hour to a speed in metres per second.
Show your working clearly.

..... m/s

(Total for Question 8 is 3 marks)

9 Solve $\frac{x+3}{4} - \frac{7-x}{5} = 4.3$

Show clear algebraic working.

$x =$ .....

(Total for Question 9 is 3 marks)

10 Given that the surface area of a sphere is 49π cm^2, find the volume of the sphere.

Give your answer correct to the nearest integer.

..... cm^3

(Total for Question 10 is 3 marks)

TOTAL FOR PAPER IS 39 MARKS

WEEK 4 TASK 5

Estimated completion time = 30 minutes.

Answer all questions.

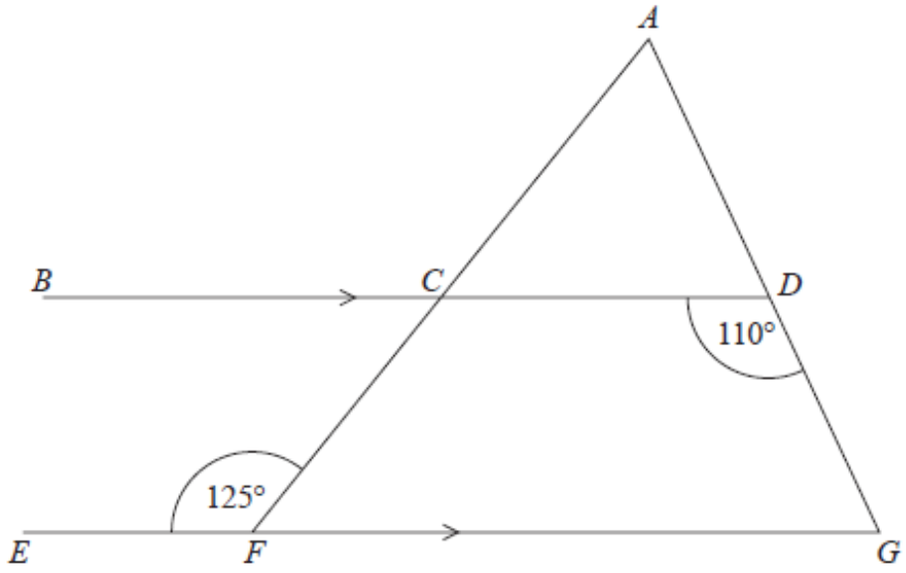
Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Show that $(x - 1)(x + 3)(x - 5)$ can be written in the form $ax^3 + bx^2 + cx + d$ where a, b, c and d are integers.

(Total for Question 1 is 3 marks)

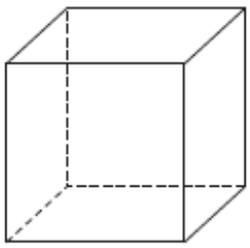
***2** *ACF* and *ADG* are straight lines.
BCD and *EFG* are parallel lines.



Show that triangle *ACD* is isosceles.
Give a reason for each stage of your working.

(Total for Question 2 is 5 marks)

***3** The diagram shows a solid cube placed on a horizontal table.

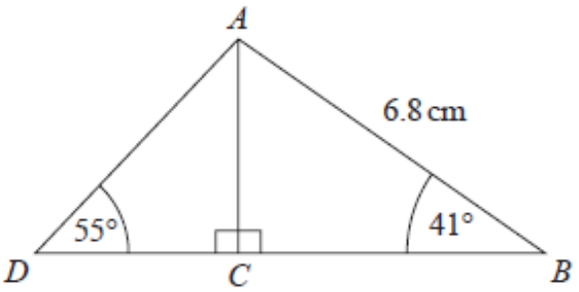


$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The pressure on the table due to the cube is 3.5 newtons/cm^2
The force exerted by the cube on the table is 504 newtons.
Show that the total surface area of the cube is less than 900 cm^2

(Total for Question 3 is 3 marks)

4 *ABD* is a triangle.
C is a point on *BD*.



Work out the length of *DC*.
Give your answer correct to 1 decimal place.

..... cm

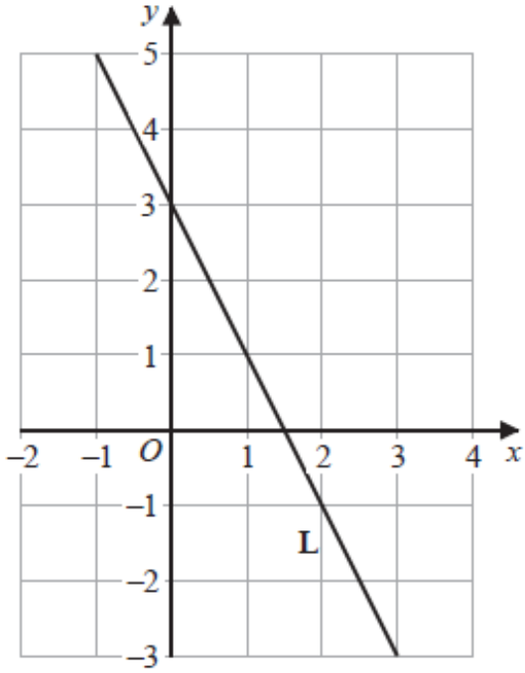
(Total for Question 4 is 3 marks)

***5** Lava flows from a volcano at a constant rate of 11.9 m^3/s
How many days does it take for 67 205 600 m^3 of lava to flow from the volcano?
Give your answer correct to the nearest day.

..... days

(Total for Question 5 is 3 marks)

***6** The line **L** is shown on the grid.

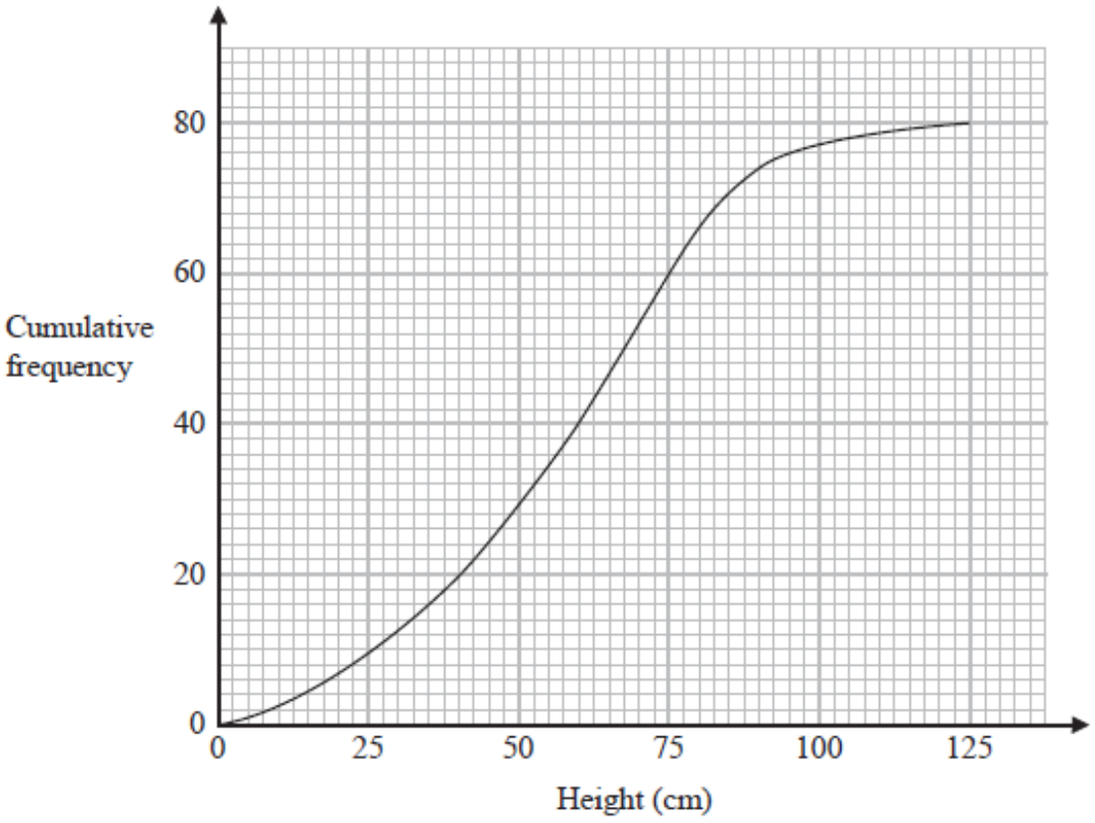


Find an equation for **L**.

.....

(Total for Question 6 is 3 marks)

7 Alan grew 80 plants of the same type outside.
The cumulative frequency graph shows information about the heights, in cm, of these plants.



Use the graph to find an estimate for the median height.

..... cm

(Total for Question 7 is 1 mark)

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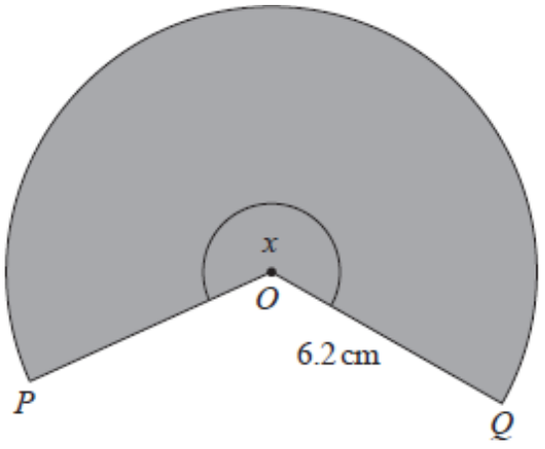
8 Write $x^2 - 8x + 3$ in the form $(x - a)^2 - b$ where a and b are integers.

.....

(Total for Question 8 is 2 marks)

9 The diagram shows a shaded sector POQ of a circle with centre O and radius 6.2 cm.



The area of the shaded sector is 82.6 cm^2
Calculate the size of angle x.
Give your answer correct to 3 significant figures.

.....°

(Total for Question 9 is 2 marks)

***10** A and B are numbers such that

$$A = 2^2 \times 3^4 \times 7$$
$$B = 3^2 \times 7^2$$

Find the highest common factor (HCF) of A and B.

.....

(Total for Question 10 is 1 mark)

***11** Work out the greatest integer that satisfies the inequality

$$5y - 7 < 16$$

.....

(Total for Question 11 is 2 marks)

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12 Prove algebraically that $0.1\dot{2}\dot{3}$ can be written as $\frac{61}{495}$

(Total for Question 12 is 3 marks)

TOTAL FOR PAPER IS 31 MARKS

Pearson

WEEK 4 MARKSCHEMES

(Higher 4-6)

WEEK 4 TASK 1

Answer all questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

***1** Write down the value of 5^{-2}

$\frac{1}{5^2}$

1 mark $\frac{1}{25}$ or 0.04

.....

(Total for Question 1 is 1 mark)

***2** The mean length of 5 sticks is 4.2 cm.
Nawal measured the length of one of the sticks as 7 cm.
(*a*) Work out the mean length of the other 4 sticks.

— — — — — = 4.2 mean

so total = $4.2 \times 5 = 21$ cm

1 mark

$21 - 7 = 14$ cm

$14 \div 4 = 3.5$

1 mark

3.5 Final mark

..... cm

(3)

Nawal made a mistake.
The stick was not 7 cm long.
It was 17 cm long.
(*b*) How does this affect your answer to part (*a*)? 1 mark

my answer would be smaller than 3.5; it would be 1cm

(21 - 17 = 4cm 4 ÷ 4 = 1)

.....

.....

(1)

(Total for Question 2 is 4 marks)

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3 Work out the value of $27^{\frac{2}{3}} + \left(\frac{1}{2}\right)^{-3}$

$27^{2/3} = (\sqrt[3]{27})^2$

$= 3^2 = 9$

1 mark for either of these

$\left(\frac{1}{2}\right)^{-3} = \left(\frac{2}{1}\right)^3$

$= \frac{2^3}{1^3} = 8$

so $9 + 8$ 1 mark

17 Final mark

(Total for Question 3 is 3 marks)

***4** Mano has three shelves of books.
There are x books on shelf **A**.

There are $(3x + 1)$ books on shelf **B**.
There are $(2x - 5)$ books on shelf **C**.
There is a total of 44 books on the three shelves.

All the books have the same mass.
The books on shelf **B** have a total mass of 7500 g.

Work out the total mass of the books on shelf **A**.

A B C

$x + 3x + 1 + 2x - 5 = 44$ 1 mark

$6x - 4 = 44$

$6x = 48$ so $x =$

1 mark for either of these

A B C

8 $3 \times 8 + 1 = 25$ $2 \times 8 - 5 = 11$

$7500 \div 25$ 1 mark

$25 \overline{)7500}$ 300

so shelf A = 8×300

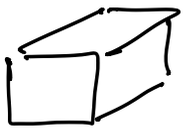
1 mark

2400 Final mark

..... g

(Total for Question 4 is 5 marks)

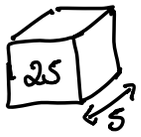
***5** A cube has a total surface area of 150 cm^2
Work out the volume of the cube.



6 faces = $150cm^2$
so 1 face = $25cm^2$

$150 \div 6 = 25$ 1 mark

5 | 25 | 5 so side length $= \sqrt{25} = 5$ 1 mark



Volume : $5 \times 5 \times 5 = 125$

1 mark

Final mark 125

..... cm^3

(Total for Question 5 is 4 marks)

---

6 y is directly proportional to x.
$y = 24$ when $x = 1.5$
Work out the value of y when $x = 5$

$y \propto x$ 1 mark

$y = kx$

$24 = k \times 1.5$

$k = \frac{24}{1.5} = 16$

so $y = 16x$

$y = 16 \times 5$ 1 mark

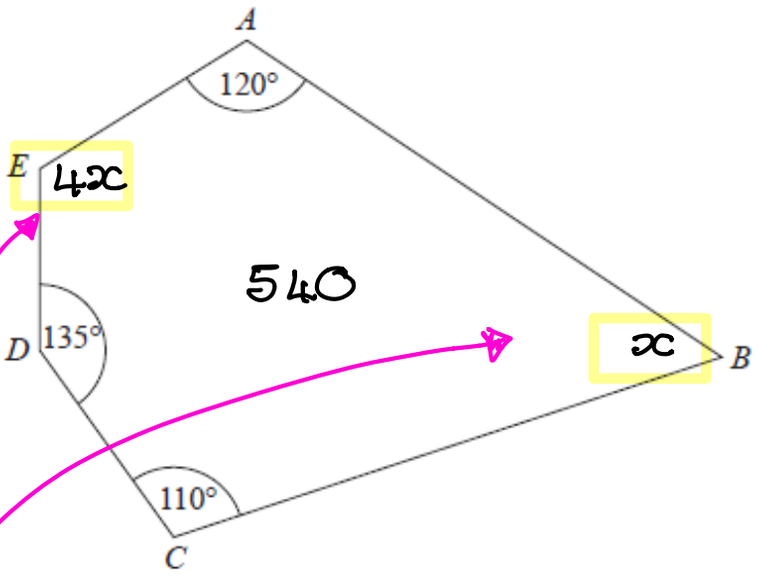
$= 80$

Final mark 80

$y =$ .....

(Total for Question 6 is 3 marks)

7 Here is a pentagon.



120
+ 135
110
365

Angle $AED = 4 \times$ angle ABC

Work out the size of angle AED.
You must show all your working.

3 sides = 180
4 sides = 360
5 sides = 540

1 mark

1 mark for using the ratio 1:4

$5x + 365 = 540$ 1 mark

$5x = 540 - 365$

$= 175$

$x = \frac{175}{5}$

$= 35$ 1 mark

$4 \overset{13}{\cancel{5}}\overset{1}{4}0$
-365
175

$5 \overline{)1'75}$ 35

$AED = 4x = 4 \times 35$

$= 140$

Final mark 140 °

(Total for Question 7 is 4 marks)

1 mark for one correct region

2 marks for two or three correct regions

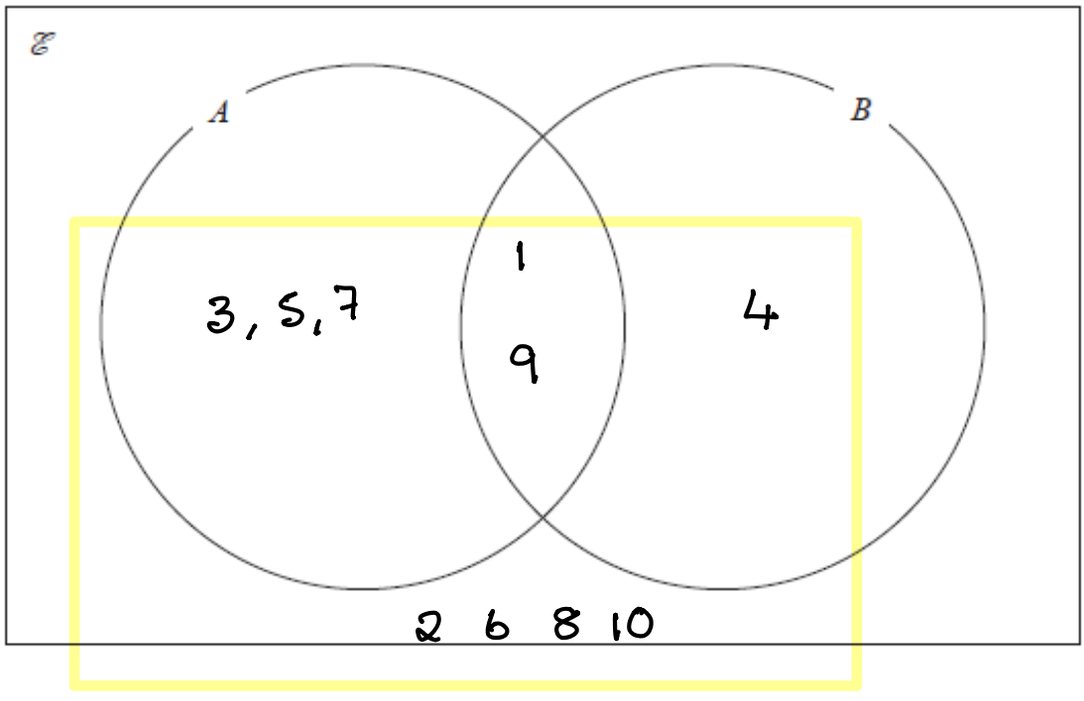
3 marks for all correct

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

A = {odd numbers}

B = {square numbers}

(*a*) Complete the Venn diagram for this information.



(3)

A number is chosen at random from the universal set $\mathscr{E}$

(*b*) Find the probability that this number is in the set B' NOT B'

2 marks

$\frac{7}{10}$

.....

(2)

(Total for Question 8 is 5 marks)

1 mark can be given for

$\frac{a}{10}$ 'a' must be between 0 and 10 or

$\frac{7}{b}$ 'b' must be greater than 7

or

7:10

***9** The diagram shows a solid cylinder on a horizontal floor.

pressure = $\frac{\text{force}}{\text{area}}$

Volume = area × 40

so

1200 = area × 40

area = $\frac{1200}{40}$ = 30 cm^2

The cylinder has a

volume of 1200 cm^3 1 mark

height of 40 cm.

The cylinder exerts a force of 90 newtons on the floor.

Work out the pressure on the floor due to the cylinder.

Pressure = ? = P

force = 90 N

Area = $30cm^2$

$P = \frac{90}{30}$ 1 mark

$= \frac{9}{3} = 3$

3 Final mark

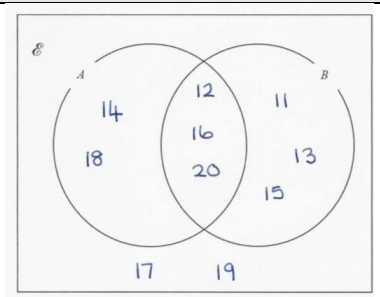
..... newtons/cm^2

(Total for Question 9 is 3 marks)

TOTAL FOR PAPER IS 32 MARKS

WEEK 4 TASK 2

Question	Working	Answer	Mark	Notes
1	$6-12x$ or $2-4x=\frac{5}{3}-\frac{8}{3}x$		3	M1 for expansion of bracket on the LHS or dividing the RHS by 3 with two terms
	$6-5=12x-8x$ or $1=4x$ or $-12x+8x=5-6$ oe or $-4x=-1$ or $\frac{8}{3}x-4x=\frac{5}{3}-2$ oe or $2-\frac{5}{3}=-\frac{8}{3}x+4x$ oe			M1 ft (dep on 4 terms) for terms in x on one side of equation; number terms on the other
	Working required	$\frac{1}{4}$		A1 oe dep on M1 awarded
				Total 3 marks

Question	Working	Answer	Mark	Notes
2			3	B3 Fully correct (B2 for 2 or 3 'regions' correct, B1 for one 'region' correct)
				Total 3 marks

Question	Working		Answer	Mark	Notes
3	eg $5x + 4y = -2$ $+ 8x - 4y = 17.6$ $(13x = 15.6)$ eg $[x = \frac{4.4 + y}{2}]$ oe $5\left(\frac{4.4 + y}{2}\right) + 4y = -2$ oe	eg $10x + 8y = -4$ $- 10x - 5y = 22$ $(13y = -26)$ eg $[y = 2x - 4.4]$ oe $5x + 4(2x - 4.4) = -2$ oe		3	M1 multiplication of one or both equation(s) with correct operation selected (allow one arithmetic error) (if + or – is not shown then assume it is the operation that at least 2 of the 3 terms have been calculated for) **or** correct rearrangement of one equation with substitution into second
	eg $5 \times$ "1.2" $+ 4y = -2$ **or** $2 \times$ "1.2" $- y = 4.4$	eg $5x + 2 \times$ "-2" $= 4.4$ **or** $2x -$ "-2" $= 4.4$			M1 (dep on previous M1 but not on a correct first value) correct method to find second unknown – this could be a correct substitution into one of the equations given or calculated or starting again with the same style of working as for the first method mark
	Working required		$x = 1.2$ $y = -2$		A1 oe eg $x = \frac{6}{5}$ for both solutions dependent on first M1
					Total 3 marks

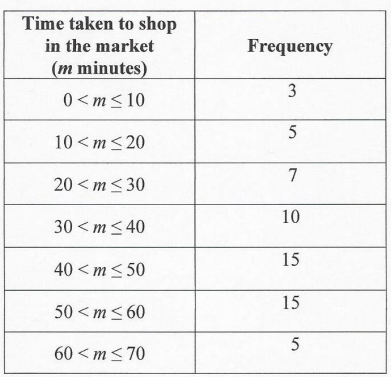
Question		Working	Answer	Mark	Notes
4	(a)		$\frac{9}{10}$	1	B1 oe
	(b)		-6	1	B1
					Total 2 marks

Question	Working	Answer	Mark	Notes
5 (a)		$\frac{2}{9}, \frac{7}{9}$	2	B1 for correct probabilities for the first card Allow equivalent probabilities e.g 0.2
		$\frac{1}{8}, \frac{7}{8}, \frac{2}{8}, \frac{6}{8}$		B1 for correct probabilities for the second card Allow equivalent probabilities
(b)	"$\frac{2}{9}$"×"$\frac{1}{8}$" or 1 – "$\frac{2}{9}$"×"$\frac{7}{8}$" – "$\frac{7}{9}$"×"$\frac{2}{8}$"– "$\frac{7}{9}$"×"$\frac{6}{8}$"		2	M1ft (All probabilities must be less than 1)
	Correct answer scores full marks (unless from obvious incorrect working)	$\frac{1}{36}$		A1ft oe probability must be less than 1 Allow equivalent decimal to at least 2 sf (truncated or rounded) for $\frac{1}{36}$ (= 0.027(77..))
(c)	"$\frac{2}{9}$"×"$\frac{7}{8}$" or "$\frac{7}{9}$"×"$\frac{2}{8}$"oe or "$\frac{2}{9}$"×"$\frac{1}{8}$"**and** "$\frac{7}{9}$"×"$\frac{6}{8}$"oe or "$\frac{1}{36}$"**and** "$\frac{7}{9}$"×"$\frac{6}{8}$"oe		3	M1ft (All probabilities must be less than 1)
	"$\frac{2}{9}$"×"$\frac{7}{8}$"+"$\frac{7}{9}$"×"$\frac{2}{8}$" or $2\times\frac{14}{72}$ oe or 1 – "$\frac{2}{9}$"×"$\frac{1}{8}$"– "$\frac{7}{9}$"×"$\frac{6}{8}$" oe or 1 – "$\frac{1}{36}$"– "$\frac{7}{9}$"×"$\frac{6}{8}$" oe			M1ft
	Correct answer scores full marks (unless from obvious incorrect working)	$\frac{7}{18}$		A1ft oe probability must be less than 1 Allow equivalent decimal to at least 2 sf (truncated or rounded) for $\frac{7}{18}$ (= 0.38(88..))
				Total 7 marks

Question	Working	Answer	Mark	Notes
6	$\frac{26}{7}, \frac{13}{8}$ oe		3	M1 both fractions expressed as improper fractions, no need for ÷ or × may be equivalent to those given eg $\frac{52}{14}, \frac{26}{16}$ etc. A student could invert $\frac{13}{8}$ and show multiplication - as shown in the 2nd M1, this mark is then implied.
	$\frac{26}{7} \times \frac{8}{13}$ oe or eg $\frac{208}{56} \div \frac{91}{56}$			M1 **or** for both fractions expressed as equivalent fractions with denominators that are a common multiple of 7 and 8 eg $\frac{208}{56} \div \frac{91}{56}$
	eg $\frac{26}{7} \times \frac{8}{13} = \frac{208}{91} = \frac{16}{7} = 2\frac{2}{7}$ **or** $\frac{26}{7} \times \frac{8}{13} = \frac{208}{91} = 2\frac{26}{91} = 2\frac{2}{7}$ **or** $\frac{\cancel{26}^{2}}{7} \times \frac{8}{\cancel{13}^{1}} = \frac{16}{7} = 2\frac{2}{7}$ **or** $\frac{208}{56} \div \frac{91}{56} = \frac{208}{91} = \frac{16}{7} = 2\frac{2}{7}$ **or** correct working to $\frac{16}{7}$ **and** writing $2\frac{2}{7} = \frac{16}{7}$ (usually on the first line of working) *working required*	shown		A1 dep on M2 **NB: use of decimals scores no marks (unless used as a check)**
				Total 3 marks

Question		Working	Answer	Mark	Notes
7	(a)		1	1	B1
	(b)		$27a^6b^{12}$	2	B2 (B1 for 2 of 3 parts in a product)
	(c)		$7x^2y^2(2y^2+3x)$	2	B2 B1 for a correct factorisation with at least 2 factors outside (eg $7x$, x^2, xy, etc) eg $7x(2xy^4+3x^2y^2)$ eg $x^2y^2(14y^2+21x)$ or for the correct common factor with just one mistake inside the bracket eg $7x^2y^2(2y+3x)$ which is missing the squared on the y term
	(d)	$y = mx + 4$ where $m \neq 0$ oe (eg $y = 2x + 4$) **or** $y = –2x + c$ or $y + 2x = c$ oe **or** $–2x + 4$ or $f(x) = –2x + 4$ oe		2	M1
		Correct answer scores full marks (unless from obvious incorrect working)	$y = –2x + 4$		A1 oe eg $y + 2x = 4$
					Total 7 marks

Question	Working	Answer	Mark	Notes
8	(54 – 24) ÷ 2 (=15) [may be marked on diagram]		5	M1
	$"15"^2-(24\div 2)^2 (=81)$			M1 ft their "15" (if > 12)
	[height =] $\sqrt{"15"^2-(24\div 2)^2}(=9)$			M1 ft their "15" (if > 12)
	$(24\times "9")\div 2$ oe			M1 figures must be from correct working
	Correct answer scores full marks (unless from obvious incorrect working)	108		A1 allow 107.9 – 108.1
	ALTERNATIVES BELOW			**Total 5 marks**
	(54 – 24) ÷ 2 (=15) [may be marked on diagram]		5	M1
	or $x=\cos^{-1}\left(\frac{"12"}{"15"}\right)(=36.86...)$ **or** $y=\sin^{-1}\left(\frac{24\div 2}{"15"}\right)(=53.13...)$ **or** $A=\cos^{-1}\left(\frac{15^2+15^2-24^2}{2\times 15\times 15}\right)(=106.2...)$ **or** $B=\cos^{-1}\left(\frac{15^2+24^2-15^2}{2\times 15\times 24}\right)(=36.8....)$			M1 ft their "15" (if > 12) [using Hero's formula S = 0.5 × 54 (= 27) and] 27 × (27 – 24) × (27 – "15") × (27 – "15")
	or "12"tan"36.86…" (= 9) (allow 8.9… for these) "12" ÷ tan"53.13…" (= 9) **or** "15" × sin "36.86…" (= 9) **or** "15" × cos "53.13…" (= 9)			M1 ft their "15" (if > 12) M2 for 0.5 × 24 × "15" × sin"36.86…" or 0.5 × "15" × "15" × sin(2 × "53.13…") or $0.5\times "15"\times "15"\times \sin("106.2...")$ **or** $\sqrt{"27"("27"-24)("27"-"15")("27"-"15")}$
	$(24\times "9")\div 2$ oe			M1
	Correct answer scores full marks (unless from obvious incorrect working)	108		A1 allow 107.9 – 108.1
				Total 5 marks

Question	Working	Answer	Mark	Notes
9 (a)		43.5 - 44.5	1	B1 ±0.5 small square
(b)	eg reading of 48 - 49		2	M1 For correct method to start the question eg a vertical line from 55 up to the line and a horizontal line from the correct point on the curve or a mark on the curve at the correct point and a mark on the vertical axis at the correct point or a correct reading of 48 to 49
	Correct answer scores full marks (unless from obvious incorrect working)	11 or 12		A1 Allow an answer of 11 or 12 (ie must be whole number)
(c)			2	B2 All values correctly filled in (NB: first 2 are already completed) (B1 for 3 or 4 correct values from 7, 10, 15, 15, 5)
				Total 5 marks

Time taken to shop in the market (m minutes)	Frequency
$0 < m \leq 10$	3
$10 < m \leq 20$	5
$20 < m \leq 30$	7
$30 < m \leq 40$	10
$40 < m \leq 50$	15
$50 < m \leq 60$	15
$60 < m \leq 70$	5

Qn	Working	Answer		Notes
10	$3x(2x-5)=6x^2-15x$ **or**		3	M1 for multiplying $3x$ by $(2x-5)$ with **both** terms correct or
	$(2x-5)^2=4x^2-10x-10x+25$ **or**			for multiplying $(2x-5)$ by $(2x-5)$ with 3 out of 4 terms correct or
	$(2x-5)^2=4x^2-20x+25$			for multiplying $(2x-5)$ by $(2x-5)$ and getting $4x^2-20x\ldots$ **or** $\ldots -20x+25$ (not for $4x^2+25$)
	$(6x^2-15x)(2x-5)=12x^3-30x^2-30x^2+75x$ oe **or**			M1ft (dep) for multiplying the product of $3x$ and $(2x-5)$ by $(2x-5)$ with 3 out of 4 terms correct or
	$(6x^2-15x)(2x-5)=12x^3-60x^2+75x$ oe **or**			for multiplying the product of $3x$ and $(2x-5)$ by $(2x-5)$ and getting $12x^3-60x^2\ldots$ **or** $\ldots -60x^2+75x$
	$3x(4x^2-10x-10x+25)=12x^3-30x^2-30x^2+75x$ oe **or**			for multiplying the product of $(2x-5)$ and $(2x-5)$ by $3x$ with 3 out of 4 terms correct or
	$3x(4x^2-20x+25)=12x^3-60x^2+75x$			for multiplying the product of $(2x-5)$ and $(2x-5)$ by $3x$ with 2 out of 3 terms correct or
				Expansion in one stage will lead to $12x^3-30x^2-30x^2+75x$ without firstly expanding two factors – award M2 for 3 out of 4 terms correct M1 for 2 out of 4 terms correct
	Working required	$12x^3-60x^2+75x$		A1 dep on M1
				Total 3 marks

WEEK 4 TASK 3

Answer all questions.

Write your answers in the spaces provided.

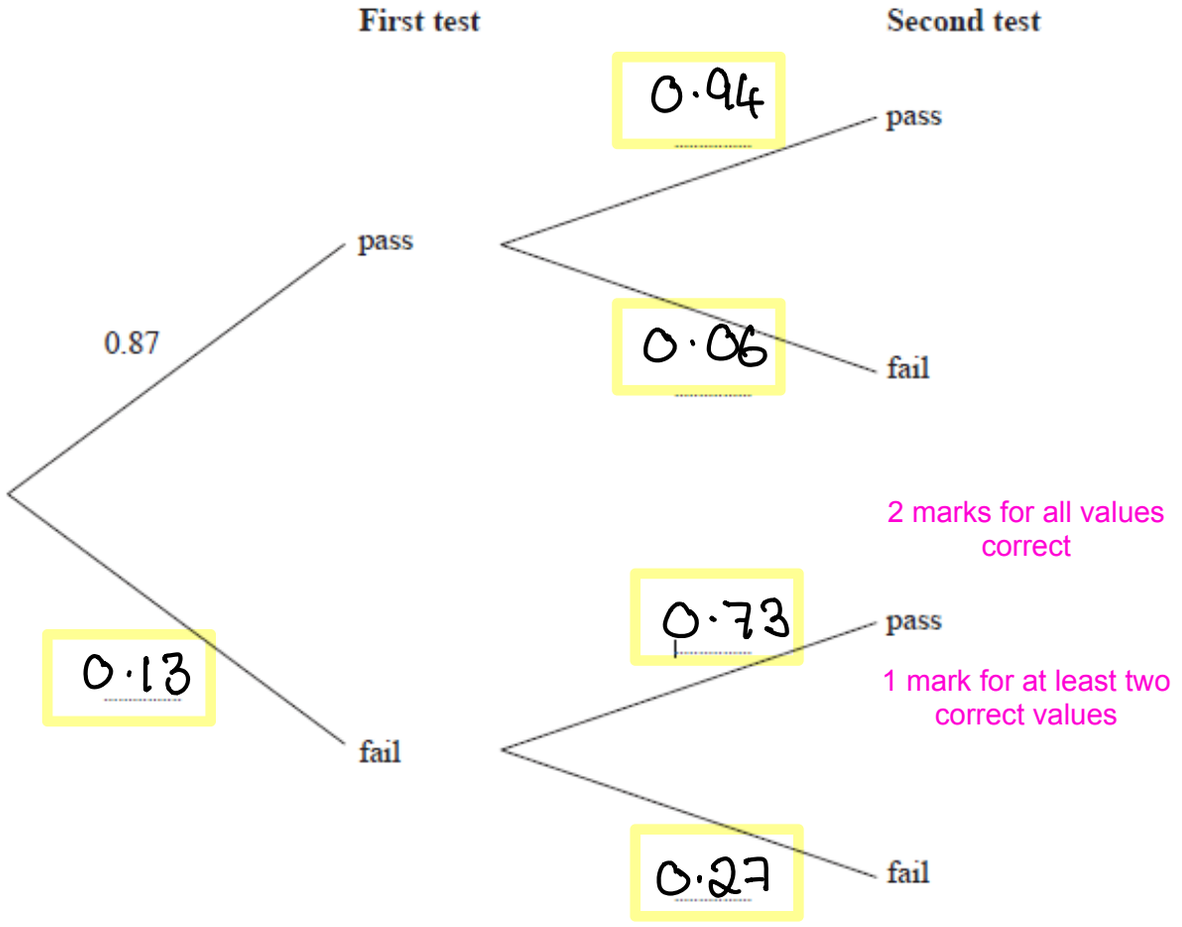
You must write down all the stages in your working.

1 Shakir has to complete two tests.

He can either pass or fail each test.
The probability that he will pass the first test is 0.87

If he passes the first test the probability he will pass the second test is 0.94
If he fails the first test the probability he will pass the second test is 0.73

(*a*) Complete the probability tree diagram for this information.



pp + pf + fp

(2)

(*b*) Work out the probability that Shakir passes at least one of the tests.

0.87 × 0.94 +
0.87 × 0.06 +
0.13 × 0.73

1 mark

0.9649

Final mark

0.9649

(3)

(Total for Question 1 is 5 marks)

***2** A number, d, is rounded to 1 decimal place.
The result is 12.7

Complete the error interval for d.

12.6 ↑ 12.7 ↑ 12.8

1 mark 1 mark

12.65 $\leq d <$ 12.75

(Total for Question 2 is 2 marks)

---

3 A number x is written correct to 2 significant figures.
The result is 1.9
Complete the error interval for x.

1.8 ↑ 1.9 ↑ 2.0

1 mark 1 mark

1.85 $\leq x <$ 1.95

(Total for Question 3 is 2 marks)

---

4 Expand and simplify $(x + 7)(x – 2)(x + 3)$

$x^2 - 2x + 7x - 14 = x^2 + 5x - 14$

1 mark

$(x + 3)(x^2 + 5x - 14)$

$= x^3 + 5x^2 - 14x + 3x^2 + 15x - 42$ 1 mark

$= x^3 + 8x^2 + x - 42$

$x^3 + 8x^2 + x - 42$ Final mark

(Total for Question 4 is 3 marks)

5 Use algebra to solve the simultaneous equations

$2x + 6y = 5$ (1) x 3
$3x - 4y = -12$ (2) x 2

1 mark for elimination of 'x' or 'y'

$6x + 18y = 15$ (3)
$6x - 8y = -24$ (4)
$18 - -8 = 26$
$15 - -24 = 39$
$26y = 39$

1 mark for y=1.5 or x=-2

$y = \frac{39}{26} = 1.5$

sub into (1) $2x + 6(1.5) = 5$

1 mark for substitution of 'x' or 'y'

$2x = -4$
$x = -2$

$x =$ -2 Final mark

$y =$ 1.5

(Total for Question 5 is 4 marks)

***6** $-2 \leq n < 5$

n is an integer.

(*a*) Write down the greatest possible value of n.

-2, -1, 0, 1, 2, 3, 4 ~~5~~

4 1 mark

(1)

(*b*) Solve $\frac{2}{5}g - 4 < 6$

$\frac{2}{5}g - 4 < 6$
$+4 \quad +4$
$\frac{2}{5}g < 10$

1 mark for '+ 4' to both sides

1 mark for 'x 5' to both sides

$\times 5 \quad \times 5$
$2g < 50$

$g < \frac{50}{2}$

$g < 25$ Final mark

(3)

(Total for Question 6 is 4 marks)

7 Show that the equation $x^4 - x^2 - 5 = 0$ can be written in the form $x = \sqrt[4]{x^2 + 5}$

$x^4 = x^2 + 5$

$x = \sqrt[4]{x^2 + 5}$

1 mark for correct rearrangement must see

(Total for Question 7 is 1 mark)

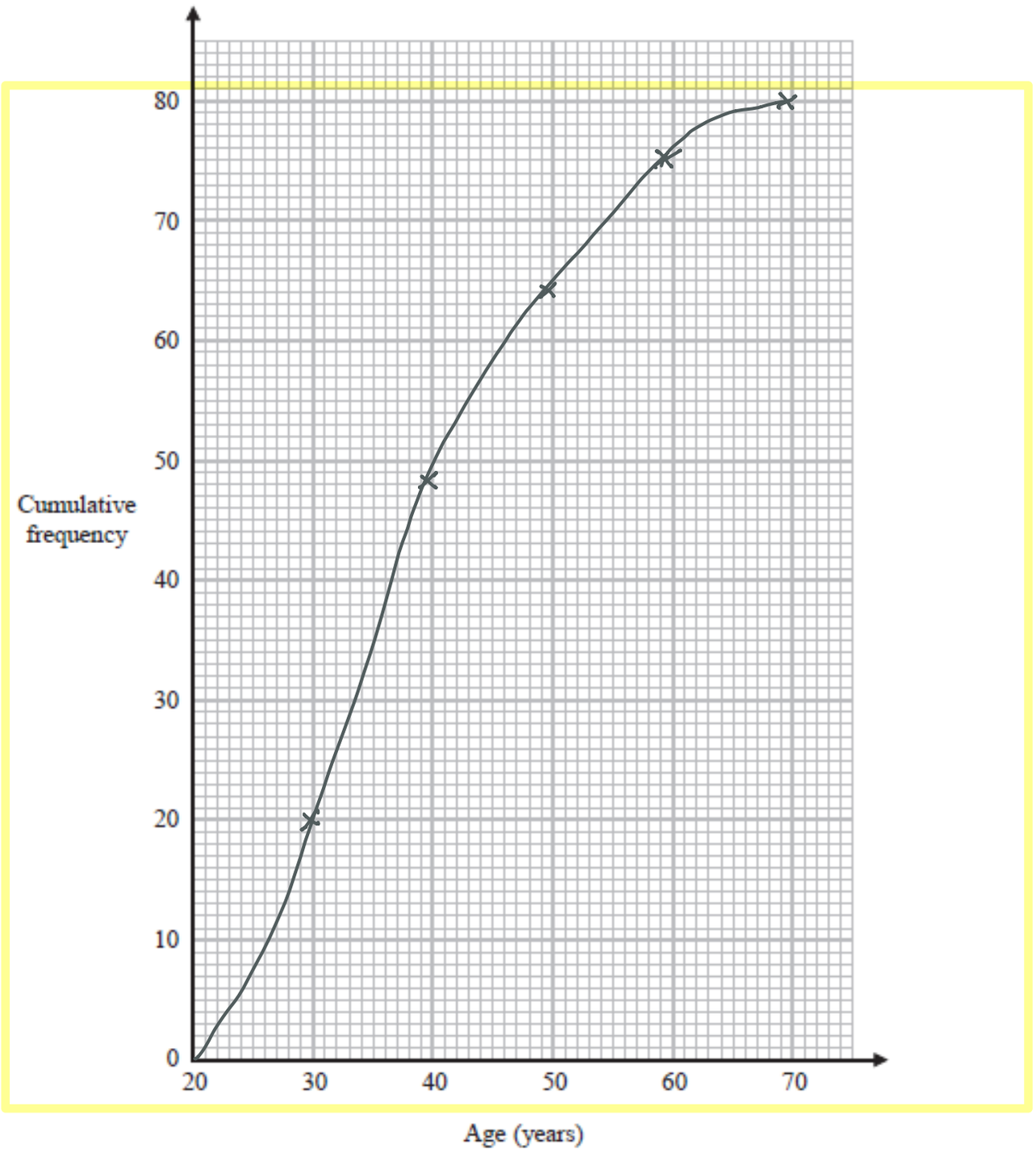
---

8 The cumulative frequency table gives information about the ages of 80 people working for a company.

Age (a years)	Cumulative frequency
$20 < a \leq 30$	20
$20 < a \leq 40$	48
$20 < a \leq 50$	64
$20 < a \leq 60$	75
$20 < a \leq 70$	80

On the grid on the next page, draw a cumulative frequency graph for this information.

(2)



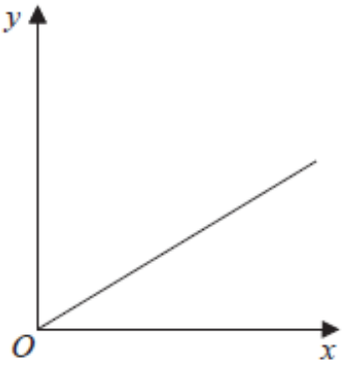
2 marks for correct graph

(Total for Question 8 is 2 marks)

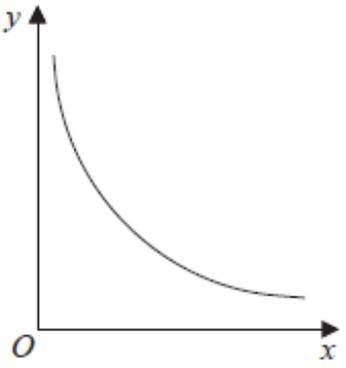
1 mark may be awarded if points plotted consistently within all class intervals (ie not at end points) and joined with a curve

9

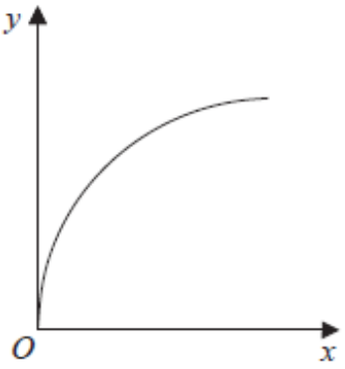
Graph A



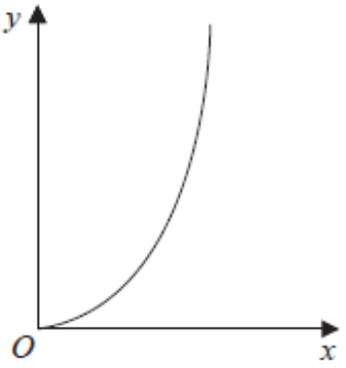
Graph B



Graph C



Graph D



The graphs of y against x represent four different types of proportionality.
Match each type of proportionality in the table to the correct graph.

Type of proportionality	Graph
$y \propto x^2$	D
$y \propto x$	A
$y \propto \frac{1}{x}$	B
$y \propto \sqrt{x}$	C

2 marks for all values correct

1 mark for at least two correct values

(Total for Question 9 is 2 marks)

10 The functions f and g are such that

$$f(x) = (2x + 3)^2 \quad \text{and} \quad g(x) = 2x - 1$$

Find gf(−3)

$gf(-3) = 2(2x+3)^2 - 1$

$= 2(2x - 3 + 3)^2 - 1$ 1 mark

$= 2(-3)^2 - 1$

$= 2 \times 9 - 1 = 17$

Final mark

17

.....

(Total for Question 10 is 2 marks)

***11** Chris, Debbie and Errol share some money in the ratio 3 : 4 : 2
Debbie gets £120
Chris then gives some of his share to Debbie and some of his share to Errol.
The money that Chris, Debbie and Errol each have is now in the ratio 2 : 5 : 3
How much money did Chris give to Errol?

C	D	E
3	4	2
	×30	
×30	£120	×30
£90		£60

1 mark

Total = £270

Total = £270

C	D	E
2	5	3

270 ÷ 10 = 27 1 mark

$2 \times 27 = £54$ $5 \times 27 = £135$ $3 \times 27 = £81$

1 mark £81 − 60 = £21

21 Final mark

£.....

(Total for Question 11 is 4 marks)

TOTAL FOR PAPER IS 31 MARKS

WEEK 4 TASK 4

Question	Working	Answer	Mark	Notes
1 (a)		0.000 625	1	B1
(b)	25 000 000 oe e.g. 25×10^6 or 0.25×10^8 **or** 2.5×10^n $n \neq 7$		2	M1
	Correct answer scores full marks (unless from obvious incorrect working)	2.5×10^7		A1
				Total 3 marks

Question	Working	Answer	Mark	Notes
2 (a)		8 and 4.5	1	B1 allow $\frac{9}{2}$ oe May be awarded if plotted correctly on the graph
(b)		Correct graph	2	M1 ft for at least 5 points plotted correctly (± half square)
	Correct answer scores full marks (unless from obvious incorrect working)			A1 for correct curve between $x = 0.5$ and $x = 5$ (clear intention to go through all the points and which must be curved) **Note**: If a fully correct graph is shown, but an incomplete table is shown in (a), then award the marks for (a)
				Total 3 marks

Question	Working	Answer	Mark	Notes
3	3×180 (= 540) or $360 - [(180 - 90) + (180 - 135) + (180 - 67) + (180 - 119)]$ (= 51) or $360 - (90 + 45 + 113 + 61)$ (= 51)		3	M1
	$90 + 135 + 67 + 119 + x =$ "540" oe $411 + x =$ "540" oe or "540" – (90 + 135 + 67 + 119) or $3 \times 180 - (90 + 135 + 67 + 119)$ oe or 540 – 411 or 180 – "51" oe			M1
	Correct answer scores full marks (unless from obvious incorrect working)	129		A1
				Total 3 marks

Question	Working	Answer	Mark	Notes
4	$1 - (0.24 + 0.4)$ (= 0.36) oe or $3x + x = 1 - (0.24 + 0.4)$ oe		4	M1
	48 ÷ 0.24 (= 200) or "0.36" ÷ 4 (= 0.09) or "0.36" ÷ 4 × 3 (= 0.27)			M1
	"0.27" × "200" or "200" × "0.36" ÷ 4 × 3 ("200" – 48 – "80") ÷ 4 × 3			M1 for a complete method
		54		A1
				Total 4 marks

Question	Working	Answer	Mark	Notes
4 **ALT**	$1 - (0.24 + 0.4)$ (= 0.36) oe or $3x + x = 1 - (0.24 + 0.4)$ oe		4	M1
	48 ÷ 24 (= 2) oe or $\left(\frac{"0.36"}{4} \times 3\right) \div 0.24 \left(= \frac{9}{8} = 1.125\right)$ oe or $\left(\frac{"36"}{4} \times 3\right) \div 24 \left(= \frac{9}{8} = 1.125\right)$ oe			M1
	$"2" \times \left(\frac{"36"}{4} \times 3\right)$ oe or $"\frac{9}{8}" \times 48$ oe or $("27" \div 24) \times 48$ oe			M1 for a complete method
	Correct answer scores full marks (unless from obvious incorrect working)	54		A1
				Total 4 marks

Question	Working	Answer	Mark	Notes
5 (a)	$(y \pm 6)(y \pm 8)$ or $y(y+6)-8(y+6)$ or $y(y-8)+6(y-8)$		2	M1 or for $(y \pm a)(y \pm b)$ where $ab = -48$ or $a + b = -2$
		$(y+6)(y-8)$		A1 oe Allow any letter for y
(b)		$x \leq 3$	1	B1 allow $3 \geq x$ Allow any letter for x
(c)	$6-14 > 12w-7w$ oe or $7w-12w > 14-6$ oe		3	M1 Condone = rather than > or any other sign for this mark.
	$-8 > 5w$ or $-5w > 8$ or $-w > \frac{8}{5}$ or $w > -\frac{8}{5}$ or $w = -\frac{8}{5}$ oe			M1 Condone = rather than > or any other sign for this mark.
	Correct answer scores full marks (unless from obvious incorrect working)	$w < -\frac{8}{5}$		A1 oe accept $-\frac{8}{5} > w$ Must have correct sign on answer line dep on M1 (sight of correct answer in working space and just $(w =) -\frac{8}{5}$ oe on answer line gains M2 only)
				Total 6 marks

Question	Working		Answer	Mark	Notes	
6	$\frac{2.9}{100} \times 5000 (= 145)$ oe **or** 1.029 × 5000 (=5145) oe **or** $1.029^2 \times 5000$ (= 5294….) oe **or** 0.058 × 5000 (= 290) oe **or** 1.058 × 5000 (= 5290)				M1 **Bank H**	
	5000 × 0.016 oe (= 80) oe **or** 5000 × 1.016 oe (= 5080) oe **or** 5000 × 0.032 (= 160) oe **or** 5000 × 1.032 (= 5160) oe	M2 for 5000×1.016^2 (= 5161.28)		4	M1 **Bank G**	
	(80 + 5000) × 0.016 (= 81.28) oe **or** 5080 × 1.016 (= 5161.28) oe				M1 **Bank G**	
	Correct answer scores full marks (unless from obvious incorrect working)		16.28		A1	
						Total 4 marks

Question	Working	Answer	Mark	Notes
7 (a)	18 000 + 14 × 1160 (= 34 240) oe or 18 000 + 16 240 (= 34 240)		4	M1
	"34 240" – 32 000 (= 2240) or $\frac{"34\,240"}{32\,000}$ (= 1.07)			M1
	$\frac{"2240"}{32\,000}(\times 100)$ or $\frac{"34\,240"}{32\,000}\times 100$ (= 107) or "1.07" – 1 (= 0.07)			M1
	Correct answer scores full marks (unless from obvious incorrect working)	7		A1
(b)	e.g. 1 − 0.15 (= 0.85) or 100(%) − 15(%) (= 85(%))		3	M1
	e.g. 39 865 ÷ 0.85 or 39 865 ÷ 85 × 100 oe			M1
	Correct answer scores full marks (unless from obvious incorrect working)	46 900		A1
				Total 7 marks

Qn	Working	Answer	Mark	Notes	
8	90×1000 (=90 000) or $\frac{90}{60\times60}(=0.025$ or $\frac{1}{40})$ **or** $\frac{1000}{60\times60}(=\frac{5}{18}=0.277...)$ **or** sight of 1500		3	M1 For one of ×1000 (eg sight of 90 000) or (÷60 ÷ 60) or ÷3600 oe ie correct conversion of distance units or of time units	M2 for 90 ÷ 3.6 **or** $90\times\frac{5}{18}$
	$\frac{90\times1000}{60\times60}$ oe eg$(1.5\times1000)\div60$			M1 For a fully correct method with correct use of brackets eg 90 000 ÷ 60 × 60 is M1 only if not recovered	
	Working required	25		A1 dep on M1	
					Total 3 marks

Question	Working	Answer	Mark	Notes
9	eg $20\times\frac{x+3}{4}-20\times\frac{7-x}{5}=20\times4.3$ or eg $5(x+3)-4(7-x)=20\times4.3$ or eg $\frac{5(x+3)}{20}-\frac{4(7-x)}{20}(=4.3)$ or eg $\frac{5(x+3)-4(7-x)}{20}(=4.3)$		3	M1 For clear intention to multiply all terms by 20 (or 4 × 5) or a multiple of 20 oe or to express LHS as two fractions over 20 (or 4 × 5) or a multiple of 20 oe or as a single fraction with a denominator of 20 (or 4 × 5) or a multiple of 20 oe if expanded numerator, allow one error
	eg $5x + 15 – 28 + 4x = 4.3 \times 20$ oe eg $9x – 13 = 86$ eg $9x = 99$			M1 Expanding brackets and multiplying by denominator with no more than one error in total from multiplying out brackets [we must see 4.3 × 20 or 86 accurately]
	Working required	11		A1 dep on M1
				Total 3 marks

Question	Working	Answer	Mark	Notes
10	$r=\sqrt{\frac{49\pi}{4\pi}}$ oe (= 3.5)		3	M1
	[volume =] $\frac{4}{3}\times\pi\times"3.5"^3$			M1
	Correct answer scores full marks (unless from obvious incorrect working)	180		A1 awrt 180
				Total 3 marks

WEEK 4 TASK 5

Answer all questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Show that $(x - 1)(x + 3)(x - 5)$ can be written in the form $ax^3 + bx^2 + cx + d$ where a, b, c and d are integers.

$(x-1)(x+3)$ 1 mark

$= x^2 + 3x - x - 3 = x^2 + 2x - 3$

$(x^2 + 2x - 3)(x - 5)$

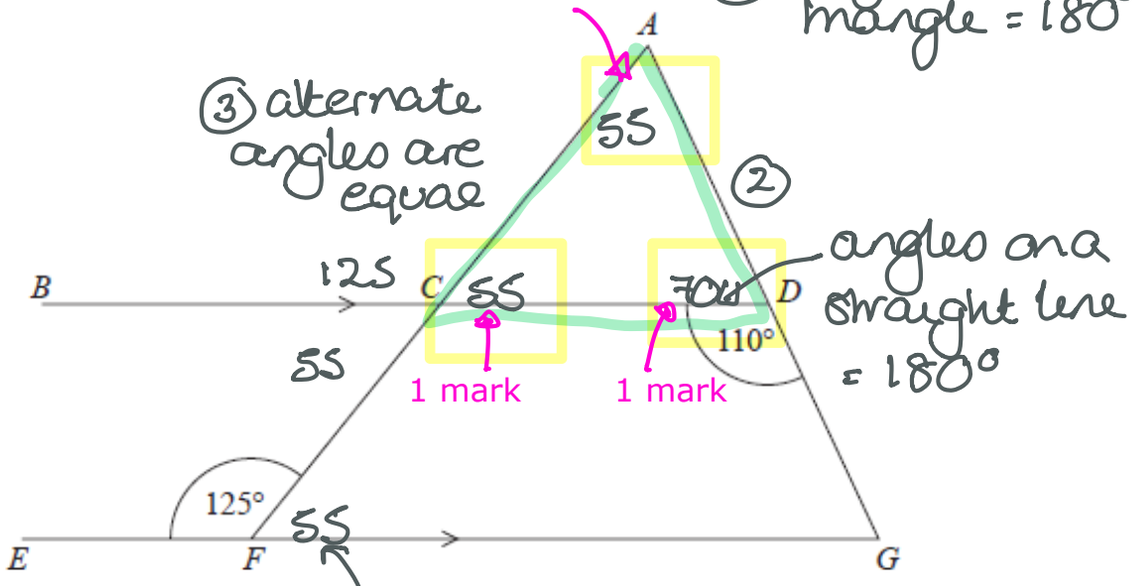
$= x^3 - 5x^2 + 2x^2 - 10x - 3x + 15$ 1 mark

$= x^3 - 3x^2 - 13x + 15$ Final mark

where $a = 1$
$b = 3$
$c = -13$
$d = 15$

(Total for Question 1 is 3 marks)

***2** *ACF* and *ADG* are straight lines.
BCD and *EFG* are parallel lines.



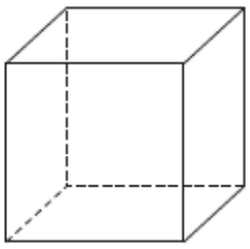
Show that triangle *ACD* is isosceles.
Give a reason for each stage of your working.

triangle ACD is isosceles as it has two angles that are the same size.

Final 2 marks are for correct reasons. One linked to parallel lines and one other valid reason.

(Total for Question 2 is 5 marks)

***3** The diagram shows a solid cube placed on a horizontal table.



$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

$$A = \frac{F}{P}$$

The pressure on the table due to the cube is 3.5 newtons/cm^2
The force exerted by the cube on the table is 504 newtons.
Show that the total surface area of the cube is less than 900 cm^2

look!

$P = 3.5 \text{ n/cm}^2$

$F = 504 \text{ N}$

$A = A$

$\text{Area} = \frac{504}{35}$ 1 mark

$= 144 \text{ cm}^2$

$\text{Total surface area} = 144 \times 6$ 1 mark

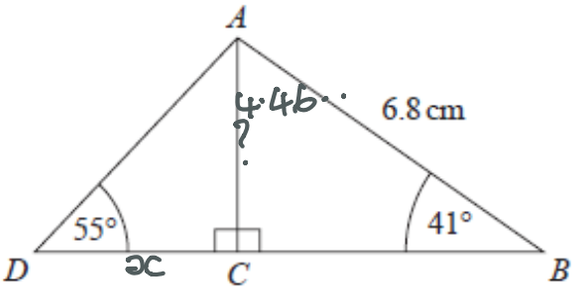
$= 864 \text{cm}^2$

$864 \text{cm}^2 < 900 \text{cm}^2$

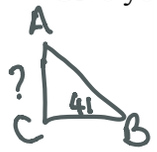
Final mark

(Total for Question 3 is 3 marks)

4 *ABD* is a triangle.
C is a point on *BD*.



Work out the length of *DC*.
Give your answer correct to 1 decimal place.



$\sin 41 = \frac{AC}{6.8}$

1 mark

$AC = 6.8 \times \sin 41$

$= 4.46120\ldots$

1 mark

$\tan 55 = \frac{4.46\ldots}{x}$

$x = \frac{4.46\ldots}{\tan 55}$

$= 3.1237\ldots$

Final mark

= 3.1 (1dp) ..... cm

Range accepted 3.1 to 3.2

(Total for Question 4 is 3 marks)

***5** Lava flows from a volcano at a constant rate of 11.9 m^3/s
How many days does it take for 67 205 600 m^3 of lava to flow from the volcano?
Give your answer correct to the nearest day.

1 mark

67205600 ÷ 11.9 = 5,647,529·412 seconds

÷ 60 minutes
÷ 60 hours
÷ 24 days

1 mark for dividing by 86400 OR sight of '86400'

$= 65.36492\ldots$

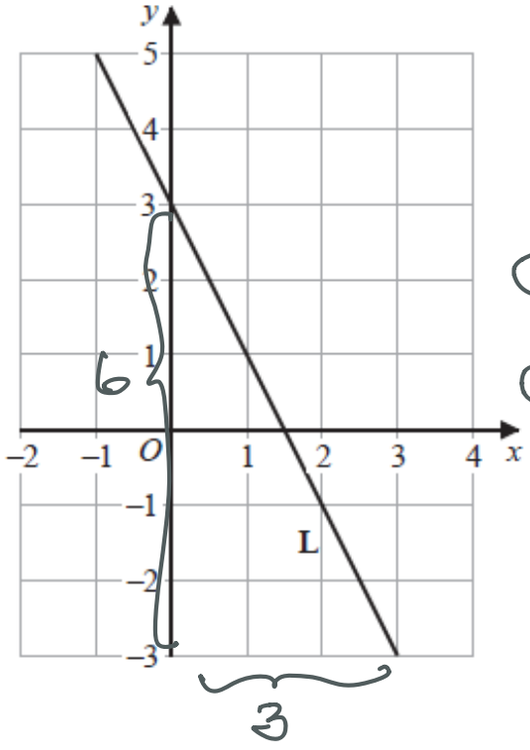
65 nearest day

Final mark

65 ..... days

(Total for Question 5 is 3 marks)

***6** The line **L** is shown on the grid.



1 mark

y intercept = 3

gradient

$= \frac{-6}{3} = -2$

1 mark

Find an equation for **L**.

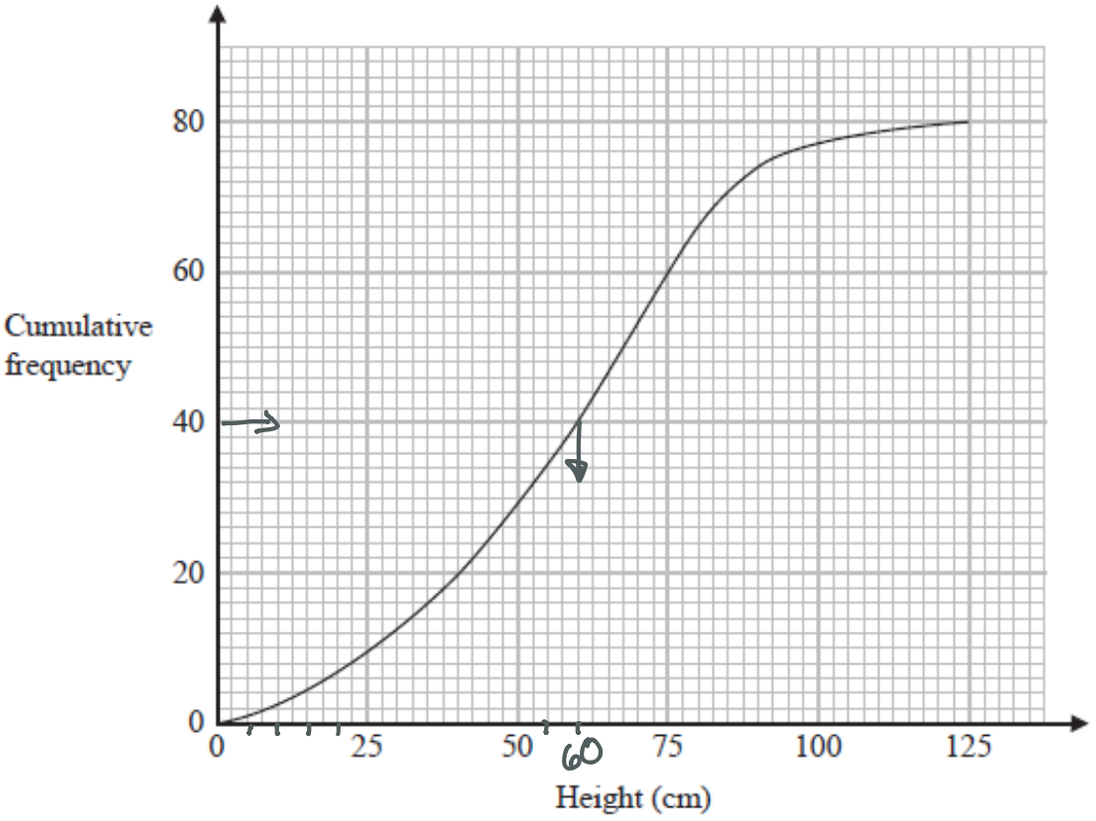
Final mark

$y = -2x + 3$

.....

(Total for Question 6 is 3 marks)

7 Alan grew 80 plants of the same type outside.
The cumulative frequency graph shows information about the heights, in cm, of these plants.



Use the graph to find an estimate for the median height.

1 mark

60

..... cm

Range accepted 58.5 to 61.5 **(Total for Question 7 is 1 mark)**

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8 Write $x^2 - 8x + 3$ in the form $(x - a)^2 - b$ where a and b are integers.

1 mark

$(x-4)^2 - 16 + 3$

so $(x-4)^2 - 13$

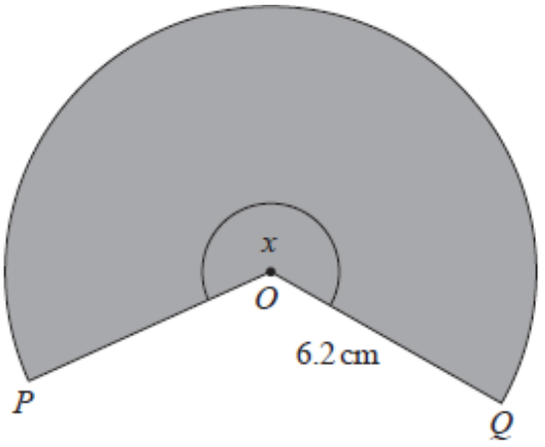
Final mark

$(x-4)^2 - 13$

.....

(Total for Question 8 is 2 marks)

9 The diagram shows a shaded sector POQ of a circle with centre O and radius 6.2 cm.



The area of the shaded sector is 82.6 cm^2

Calculate the size of angle x.

Give your answer correct to 3 significant figures.

1 mark

$\frac{x}{360} \times \pi \times 6.2^2 = 82.6$

$x = \frac{82.6 \times 360}{\pi \times 6.2^2} = 246.2347\ldots$

246 Final mark

Answers accepted in the range 246 to 247

(Total for Question 9 is 2 marks)

***10** A and B are numbers such that

$A = 2^2 \times 3^4 \times 7$

$B = 3^2 \times 7^2$

Find the highest common factor (HCF) of A and B.

$A = 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 7$

$B = 3 \times 3 \times 7 \times 7$

$HCF = 3 \times 3 \times 7$

$= 9 \times 7$

$= 63$

1 mark

63

(Total for Question 10 is 1 mark)

***11** Work out the greatest integer that satisfies the inequality

$$5y - 7 < 16$$

$+7 \quad +7$

$5y < 23$

1 mark

$y < \frac{23}{5}$

$y < 4.6$

4

Final mark

.....

(Total for Question 11 is 2 marks)

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12 Prove algebraically that $0.1\dot{2}\dot{3}$ can be written as $\frac{61}{495}$

$100x = 12.323\ldots$

$x = 0.1232323\ldots$

1 mark. Accept 10x, 1000x etc

$99x = 12.2$

$x = \frac{12.2}{99}$

1 mark

$\frac{12.2}{99} = \frac{122}{990}$

$\frac{122}{990} = \frac{61}{495}$

Final mark

(Total for Question 12 is 3 marks)

TOTAL FOR PAPER IS 31 MARKS