PINPOINT REVISION PACKS

50_to_72_Percent_Pinpoint_AI_Pack

Time Allocation = 90mins , Max = 80 Marks

Calculated Grade Boundaries:

Grade	Marks
5-	12
5	23
5+	35
6-	46
6	58
6+	69
7-	80

Question 1 (AO1): (No Calc) 47% of students got this right (2 marks)

9 Jules buys a washing machine.

20% VAT is added to the price of the washing machine.
Jules then has to pay a total of £600.

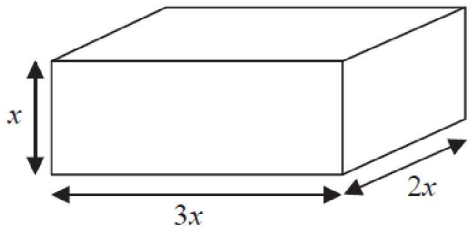
What is the price of the washing machine with **no** VAT added?

£.....

(Total for Question 9 is 2 marks)

Question 2 (AO3): 47% of students got this right (3 marks)

9 Here is a cuboid.



All measurements are in centimetres.
x is an integer.
The total volume of the cuboid is less than 900 cm^3.

Show that $x \leq 5$.

Question 3 (AO1): 47% of students got this right (3 marks)

7 Work out an estimate for the value of $\frac{\sqrt{4.93 \times 17.1}}{0.209}$

.....

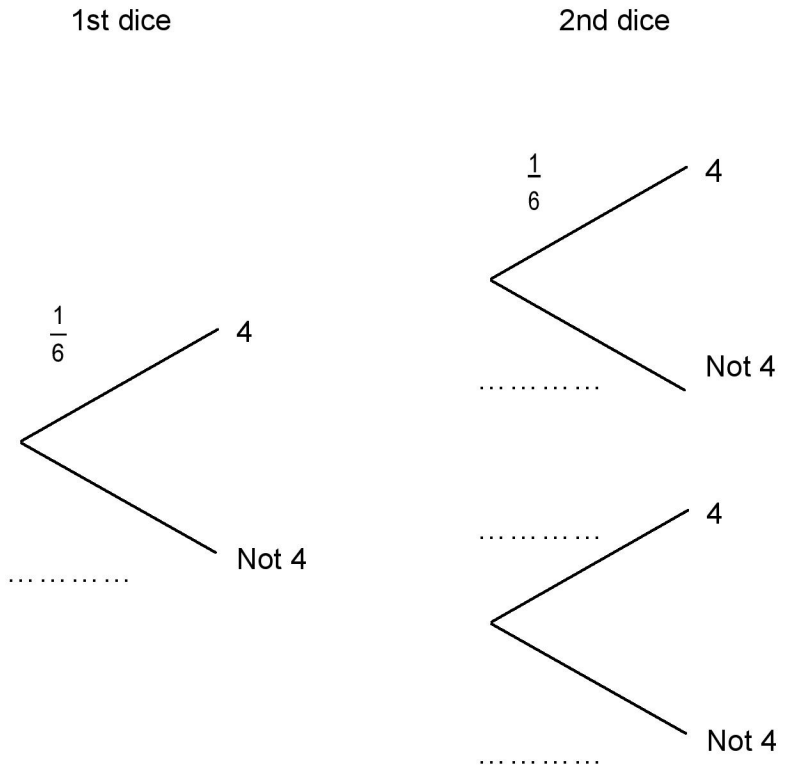
(Total for Question 7 is 3 marks)

Question 4 (AO1): 46% of students got this right (4 marks)

11 Two ordinary fair dice are rolled.

11 (a) Complete the tree diagram.

[1 mark]



11 (b) Circle the probability that **both** dice land on 4

[1 mark]

$\frac{1}{4}$ $\frac{2}{12}$ $\frac{2}{6}$ $\frac{1}{12}$ $\frac{1}{36}$

11 (c) Work out the probability that at least one of the dice does **not** land on 4

[2 marks]

Answer _____

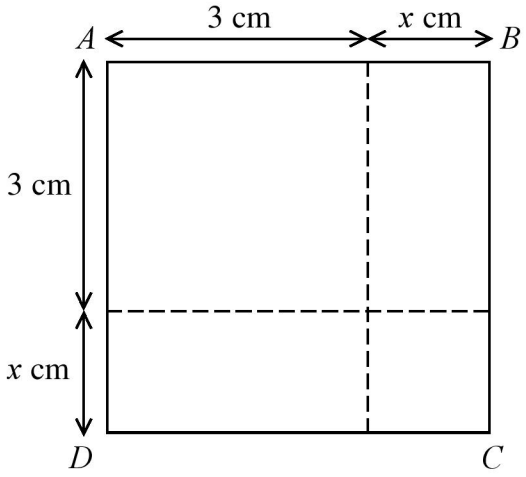
Question 5 (AO1): (No Calc) 45% of students got this right (3 marks)

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

(Total for Question 10 is 3 marks)

Question 6 (AO3): (No Calc) 45% of students got this right (3 marks)

4



The area of square $ABCD$ is 10 cm^2.

Show that $x^2 + 6x = 1$

(Total for Question 4 is 3 marks)

Question 7 (AO3): 45% of students got this right (5 marks)

8 (a) Here are the fourth and fifth terms of a Fibonacci-type sequence.

____ ____ ____ 28 43

Each term is the sum of the previous two terms.
Show that the first term is 2

[2 marks]

8 (b) Here are the first and third terms of a different Fibonacci-type sequence.

a ____ b ____ ____

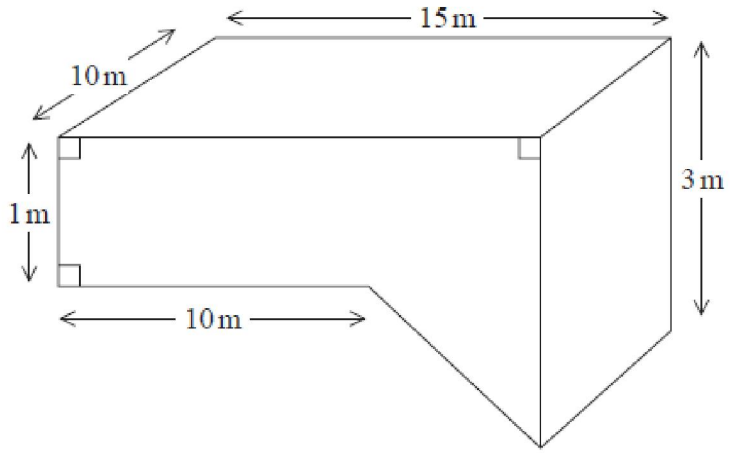
Each term is the sum of the previous two terms.
Work out an expression in terms of a and b for the fifth term.

[3 marks]

Answer _____

Question 8 (AO3): (No Calc) 45% of students got this right (5 marks)

4.



The diagram shows a swimming pool.
The swimming pool is in the shape of a prism.
The swimming pool is filled with water at a rate of 5 litres per second.

Jeremy has 10 hours to fill the swimming pool.
1 m^3 = 1000 litres.

Will he completely fill the swimming pool in 10 hours?
You must show all your working.

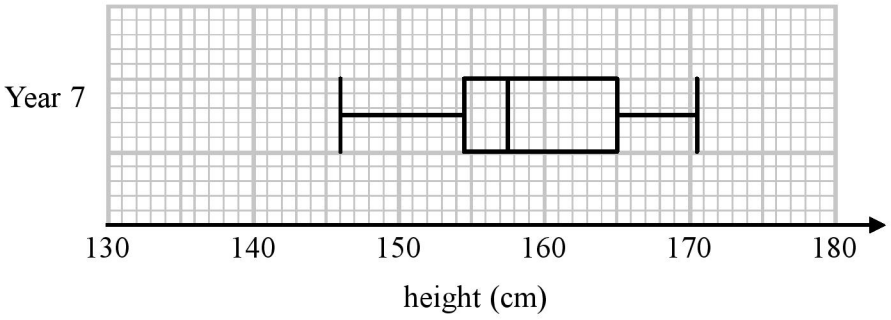
Question 9 (AO2): (No Calc) 45% of students got this right (2 marks)

12 b The table shows information about the heights, in cm, of a group of Year 11 girls.

	height (cm)
least height	154
median	165
lower quartile	161
interquartile range	7
range	20

(*a*) Draw a box plot for this information.

The box plot below shows information about the heights, in cm, of a group of Year 7 girls.



(*b*) Compare the distribution of heights of the Year 7 girls with the distribution of heights of the Year 11 girls.

.....

.....

.....

.....

(2)

(Total for Question 12 b is 2 marks)

Question 10 (AO1): 45% of students got this right (3 marks)

10 y is inversely proportional to x
When $x = 1.5$, $y = 36$

Find the value of y when $x = 6$

Question 11 (AO3): (No Calc) 44% of students got this right (3 marks)

9. 1 litre of a liquid **P** has a mass of p grams.
1 litre of a liquid **Q** has a mass of q grams.

A liquid **R** is made by mixing a volume of liquid **P** with a volume of liquid **Q** in the ratio 3 : 7

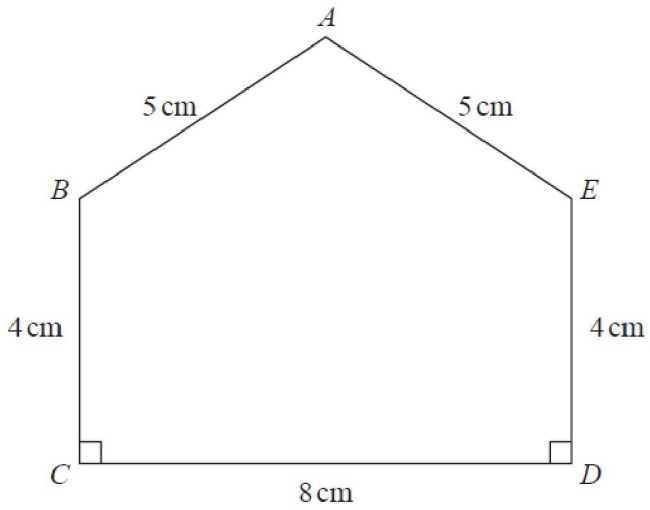
Find an expression, in terms of p and q, for the mass of 50 litres of liquid **R**.
.

..... grams

(Total for Question 9 is 3 marks)

Question 12 (AO3): (No Calc) 44% of students got this right (5 marks)

3 *ABCDE* is a pentagon.



Work out the area of *ABCDE*.

..... cm^2

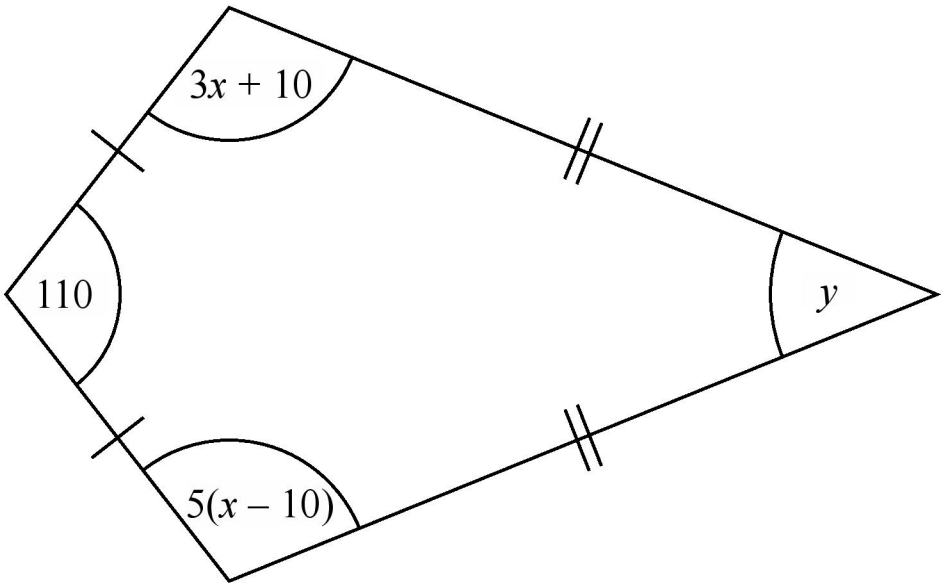
(Total for Question 3 is 5 marks)

Question 13 (AO1): (No Calc) 43% of students got this right (1 marks)

1 (*c*) Write down the value of 3^{-2}

Question 14 (AO2): (No Calc) 43% of students got this right (4 marks)

4 Here is a kite.



All angles are measured in degrees.

Work out the value of y.

Question 15 (AO1): 42% of students got this right (3 marks)

19 (a) Work out the value of $\sqrt{2}^4$

[1 mark]

Answer _____

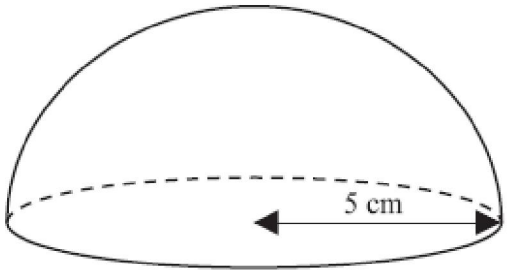
19 (b) Expand and simplify $(\sqrt{2} + 3)^2$

[2 marks]

Answer _____

Question 16 (AO1): 41% of students got this right (3 marks)

13. The diagram shows a solid hemisphere of radius 5 cm.



Surface area of sphere = $4\pi r^2$

Find the **total** surface area of the solid hemisphere.
Give your answer in terms of π.

..... cm^2

(Total 3 marks)

Question 17 (AO1): 40% of students got this right (1 marks)

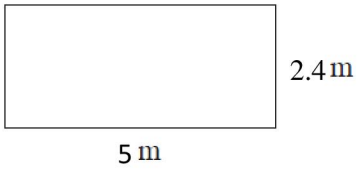
15 Circle the expression that is equivalent to $\frac{2x^2+1}{x}$ where x is not equal to 0

[1 mark]

$2x + 1$ $2x^2 + \frac{1}{2}$ $2x + \frac{1}{x}$ $4x + \frac{1}{x}$

Question 18 (AO3): (No Calc) 40% of students got this right (5 marks)

5a The diagram shows a rectangular floor.



Felix is going to cover the floor with rectangular tiles.
Each tile is 50 cm by 40 cm.
$\frac{1}{6}$ of the tiles will be orange.
Some of the tiles will be purple.
The rest of the tiles will be red.

The ratio of the number of purple tiles to the number of red tiles will be 1 : 4

(a) Assuming there are no gaps between the tiles, how many tiles of each colour will Felix need?

orange tiles .....

purple tiles .....

red tiles .....

(5)

Question 19 (AO2): (No Calc) 37% of students got this right (4 marks)

4 On Tuesday, Thyreece travelled by train from Leicester to Bristol.

Thyreece's train left Leicester at 09 45
It got to Bristol at 12 15
The train travelled at an average speed of 110 miles per hour.

On Thurday, Gisella travelled by train from Leicester to Bristol.

Gisella's train also left at 09 45 but was diverted.
The train had to travel an extra 37 miles.
The train got to Bristol at 12 45

Work out the difference between the average speed of Thyreece's train and the average speed of Gisella's train.

..... miles per hour

(Total for Question 4 is 4 marks)

Question 20 (AO1): 37% of students got this right (3 marks)

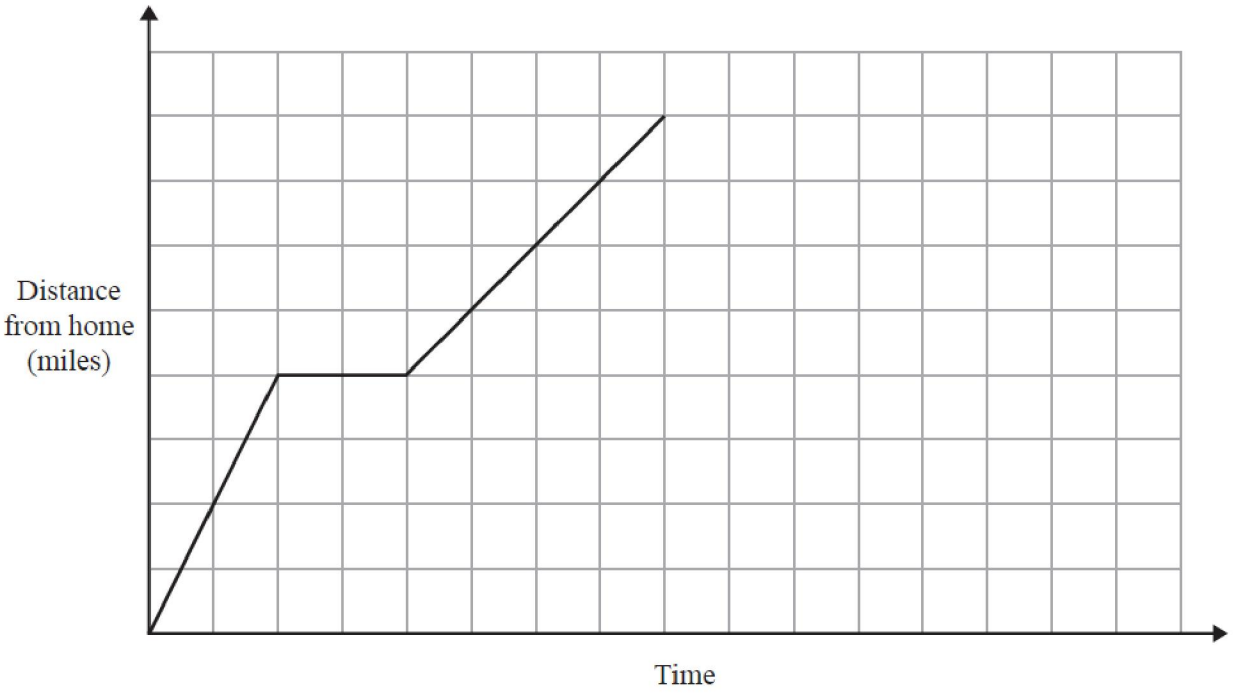
12. (a) Simplify fully $\dfrac{x^2+3x-4}{2x^2-5x+3}$

.....

(3)

Question 21 (AO2): 36% of students got this right (4 marks)

6 On Tuesday Rihanna delivered a package to a hotel.
The travel graph represents Rihanna's journey to the hotel.



Rihanna left home at 15 00
She drove for 30 minutes at a constant speed of 40 mph.
She then stopped for a break.

Rihanna then drove to the hotel at a constant speed.
She was at the hotel for 30 minutes.
She then drove home at a constant speed of 35 mph.

Show that she does not arrive home before 18 30

(Total for Question 6 is 4 marks)

Question 22 (AO2): 34% of students got this right (4 marks)

16.

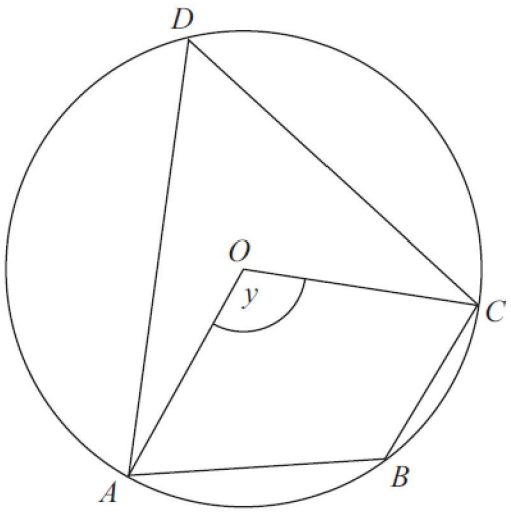


Diagram **NOT** accurately drawn

A, B, C and D are points on the circumference of a circle, centre O.

Angle $AOC = y$.

Find the size of angle ABC in terms of y.
Give a reason for each stage of your working.

(Total 4 marks)

Question 23 (AO1): 32% of students got this right (3 marks)

12. (b) Write $\frac{4}{x+2} + \frac{3}{x-2}$ as a single fraction in its simplest form.

.....

(3)

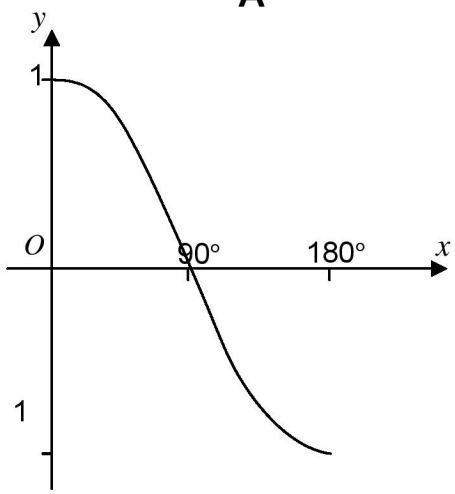
Question 24 (AO1): 30% of students got this right (1 marks)

16 One of these is a sketch of $y = \cos x$ for $0° \leqslant x \leqslant 180°$
Which one?

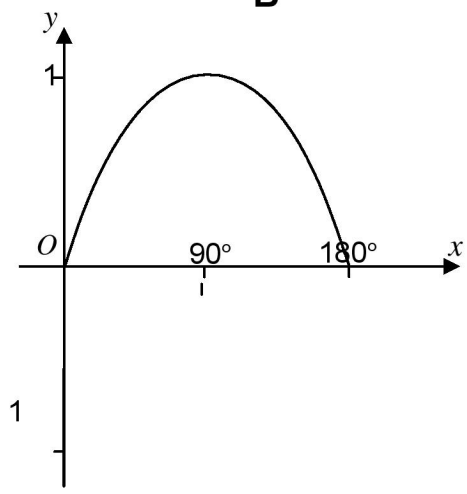
Circle the correct letter.

[1 mark]

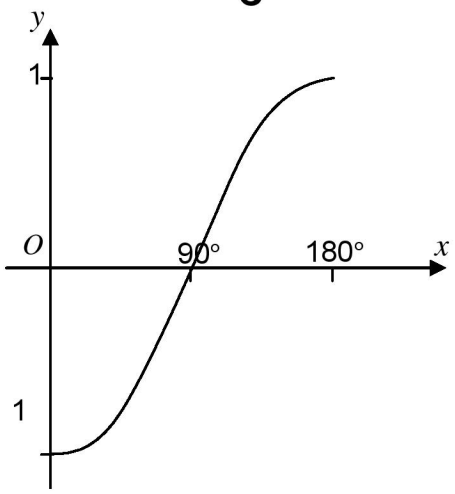
A



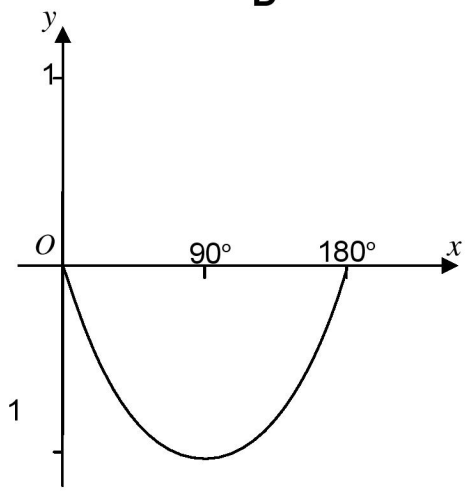
B



C

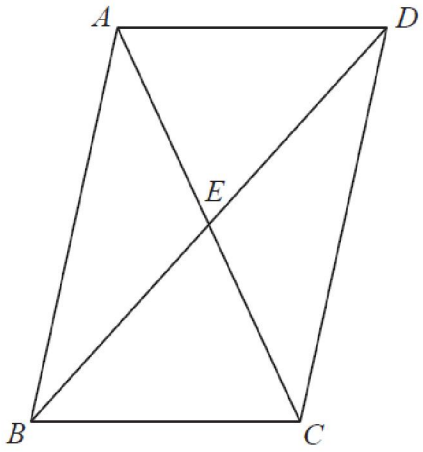


D



Question 25 (AO1): 29% of students got this right (3 marks)

12 *ABCD* is a parallelogram.

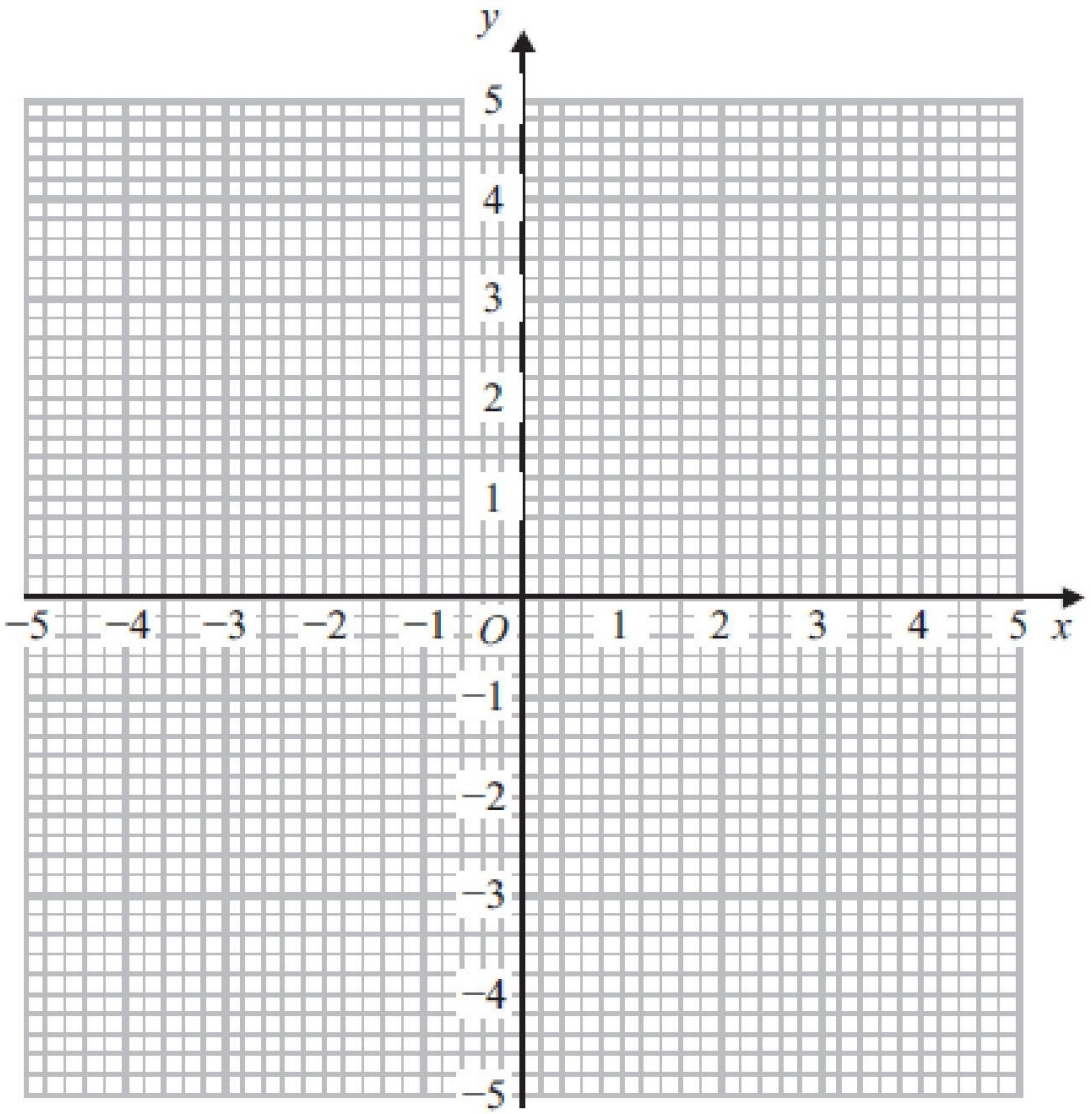


E is the point where the diagonals *AC* and *BD* meet.

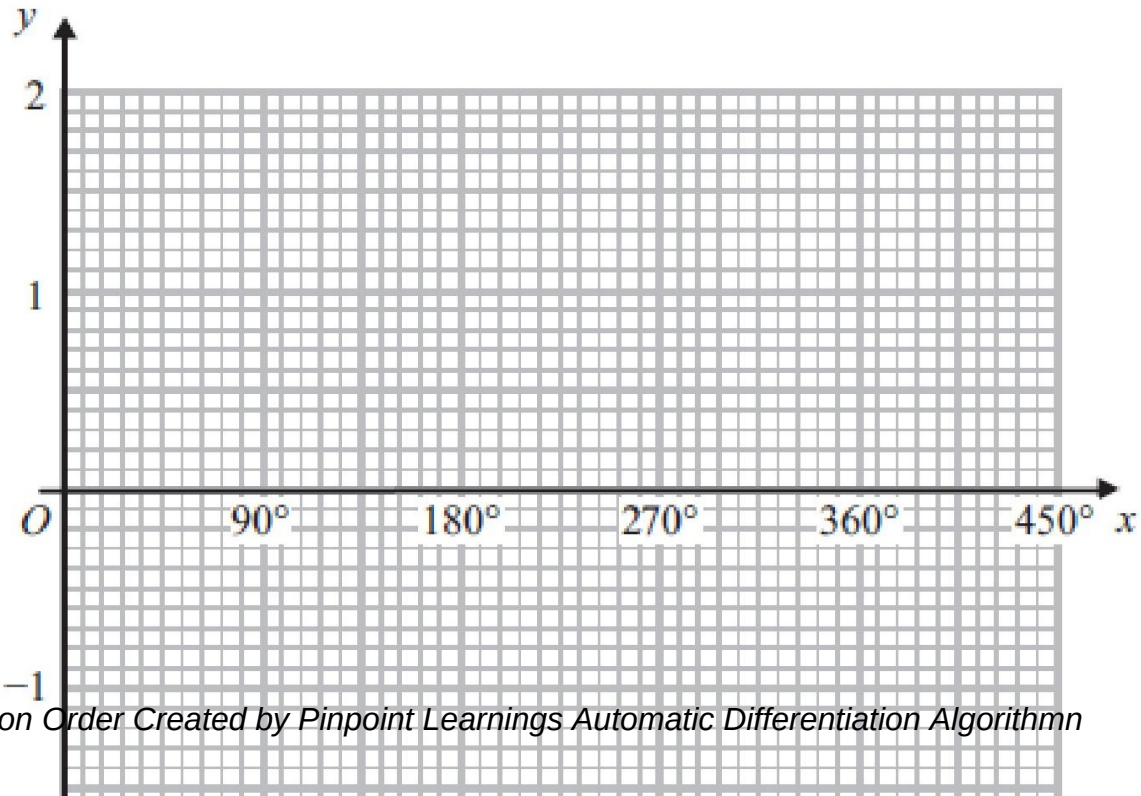
Prove that triangle *ABE* is congruent to triangle *CDE*.

Ext Qn1 (AO1): (No Calc) Only 23% of students got this right(4 mark

27.



(a) On the grid, draw the graph of $x^2 + y^2 = 4$



Ext Qn2 (AO3): Only 23% of students got this right(1 marks)

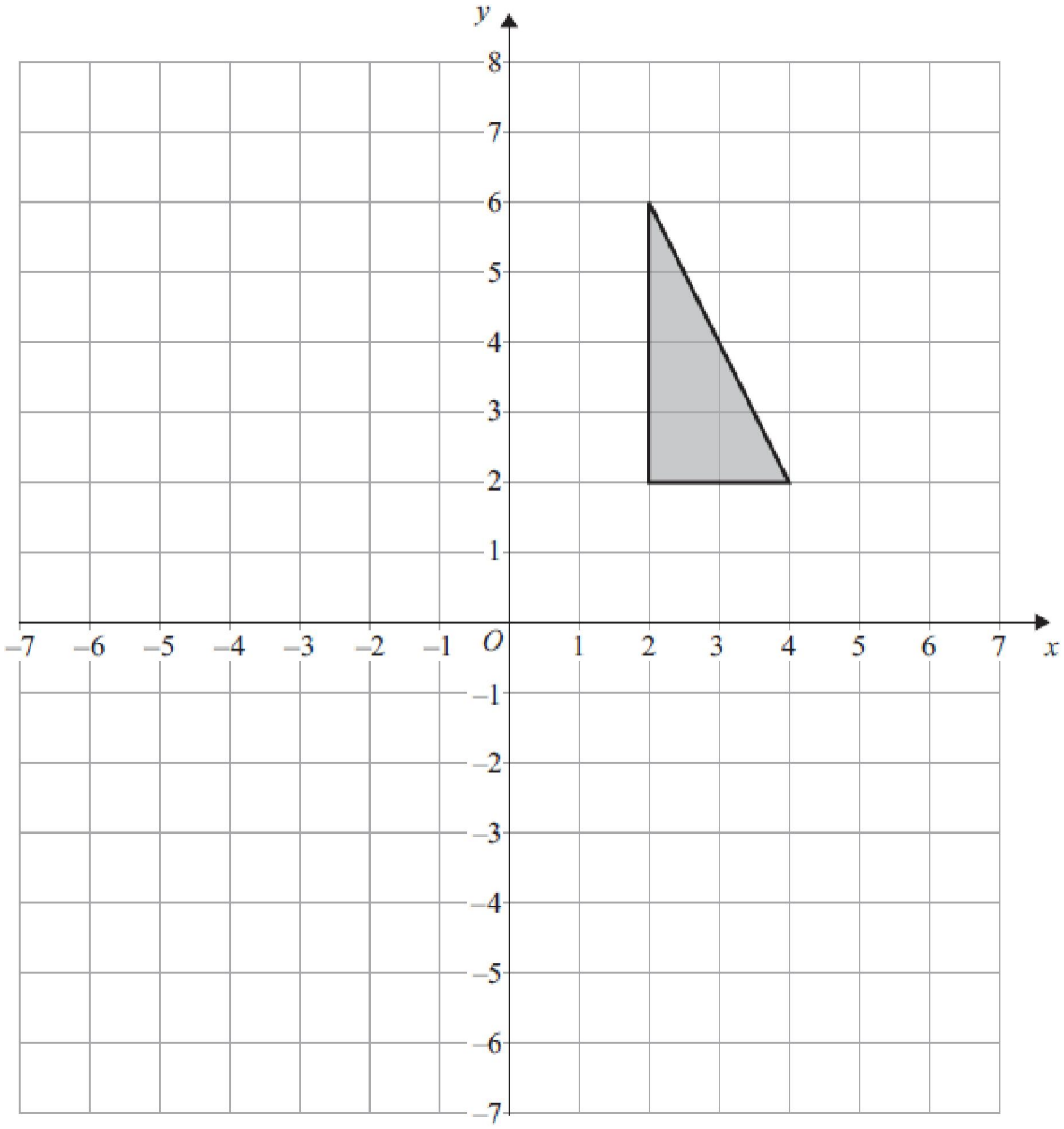
10 Find the value of $16^{-\frac{3}{4}}$

.....

(Total for Question 10 is 1 mark)

Ext Qn3 (AO1): Only 23% of students got this right(3 marks)

18.



Enlarge the shaded shape by a scale factor of $-1\frac{1}{2}$, centre (0, 4).

Answers to Qn 1 (AO1): (No Calc) 47% of students got this right

Question 9 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	Price of washing machine (x) + 20% = 600 $x + 0.2x = 600$ $1.2x = 600$ $x = 600 \div 1.2$	M1	This mark is given for a complete method to find the price of the washing machine before VAT of 20% was added
	500	A1	This mark is given for the correct answer only

Answers to Qn 2 (AO3): 47% of students got this right

Paper 1MA1: 1H			
Question	**Working**	**Answer**	**Notes**
9	$x \times 2x \times 3x =$	Reasoning to reach $x \leq 5$	M1 Starts reasoning to find volume in terms of x M1 Gives inequality $6x^3 \leq 900$ or substitutes 5 and 6 into $6x^3$ M1 Completes reasoning to show $x \leq 5$

Answers to Qn 3 (AO1): 47% of students got this right

7 Work out an estimate for the value of $\frac{\sqrt{4.93\times17.1}}{0.209}$

$$\frac{\sqrt{5\times20}}{0.2} = \frac{\sqrt{100}}{0.2} = \frac{10}{0.2}$$

$$= \frac{50}{1} = 50$$

..... 50 .....

(Total for Question 7 is 3 marks)

Answers to Qn 4 (AO1): 46% of students got this right

11(a)	$\frac{1}{6}$ and $\frac{5}{6}$ on each pair of branches	B1	In correct order
	Additional Guidance		

11(b)	$\frac{1}{36}$	B1	

	Answer	**Mark**	**Comments**
11(c)	**Alternative method 1**		
	1 – their $\frac{1}{36}$	M1	
	$\frac{35}{36}$	A1ft	ft from part (b) provided probabilities < 1
	Alternative method 2		
	$\frac{1}{6}\frac{5}{6}2 + \frac{5}{6}\frac{5}{6}$	M1	oe
	$\frac{35}{36}$	A1ft	ft from part (a)
	Additional Guidance		

Answers to Qn 5 (AO1): (No Calc) 45% of students got this right

Question 10 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$(x + 1)(x + 2) = x^2 + x + 2x + 2$ or $(x + 2)(x + 3) = x^2 + 2x + 3x + 6$ or $(x + 1)(x + 3) = x^2 + x + 3x + 3$	M1	This mark is given for a method to find the product of any two of three linear expressions
	$(x + 3)(x^2 + x + 2x + 2)$ or $(x + 1)(x^2 + 2x + 3x + 6)$ or $(x + 2)(x^2 + x + 3x + 3)$ $= x^3 + x^2 + 2x^2 + 3x^2 + 2x + 3x + 6x + 6$	M1	This mark is given for a for method to find the full expansion of three brackets
	$x^3 + 6x^2 + 11x + 6$ $(a = 1, b = 6, c = 11, d = 6)$	A1	This mark is given for the correct answer only

Answers to Qn 6 (AO3): (No Calc) 45% of students got this right

Question 4 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$(x + 3) \times (x + 3)$	M1	This mark is given for writing the area using algebraic terms
	$x^2 + 3x + 3x + 9 = 10$	M1	This mark is given for expanding $(x + 3)(x + 3)$
	$x^2 + 6x = 1$	A1	This mark is given for rearranging to give the given expression

Answers to Qn 7 (AO3): 45% of students got this right

Q	Answer	Mark	Comments
8(a)	**Alternative method 1**		
	43 – 28 or 15 seen	M1	
	15 – 13 (= 2) or 2, 13 and 15	A1	
	Alternative method 2		
	$x + 2y = 28$ and $2x + 3y = 43$	M1	oe equations
	Solves equations correctly obtaining $x = 2$	A1	
	Additional Guidance		
	If setting up two equations, they must be correct		
8(b)	$b - a$	M1	Second term
	$2b - a$	M1dep	oe Fourth term
	$3b - a$	A1	
	Additional Guidance		

Answers to Qn 8 (AO3): (No Calc) 45% of students got this right

4		No with correct figures	P1	starts process eg. starts to find volume by showing how to find a prism which is part of the shape, or shows how to find the complete cross-sectional area, e.g. $(1 \times 10 \times 10)$ or $(\frac{1}{2} \times 2 \times 5) + (1 \times 15)$ (=20)
			P1	(dep P1) complete process shown to find the vol of the pool (=200 m^3)
			P1	process to convert between litres and cm^3, e.g. 1 cm^3 = 100 000 litres or 200 000 litres
			A1	time taken, e.g. 40 000 sec, 666.66.. minutes, 11.11.. hours
			C1	comparison with correct comparable figures used, e.g. 36 000 < 40 000, 600 < 666.66…, or 11.11… (10 given)

Answers to Qn 9 (AO2): (No Calc) 45% of students got this right

Question 12b (Total 2 marks)

Part	Working an or answer examiner might expect to see	Mark	Notes
(b)	The median height of Year 7 girls is smaller than that of Year 11 girls	1	This mark is given for a statement making a comparison of the medians, in context
	Year 11 girls have a smaller range of heights than Year 7 girls	1	This mark is given for a statement making a comparison of the spreads, in context

Answers to Qn 10 (AO1): 45% of students got this right

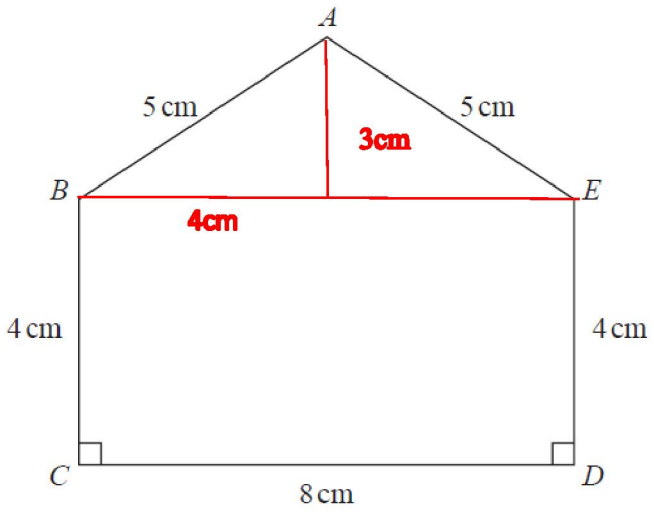
Paper 1MA1: 1H			
Question	**Working**	**Answer**	**Notes**
10		9	M1 Finds constant 36×1.5 (=54) or $\frac{6}{1.5}=4$ M1 $54 \div 6$ or $36 \div 4$ A1 9 cao

Answers to Qn 11 (AO3): (No Calc) 44% of students got this right

9		$5(3p + 7q)$	P1	for start to process, e.g. derivation of algebra using information, e.g. $3p + 7q$ or 50 divided in the ratio 3: 7
			P1	for process to find mass of 1 litre of R, e.g. $(3p + 7q) \div (3+7)$ or 15 : 35 oe
			A1	Oe

Answers to Qn 12 (AO3): (No Calc) 44% of students got this right

3 *ABCDE* is a pentagon.



Work out the area of *ABCDE*.

Triangle height = $\sqrt{5^2 - 4^2} = \sqrt{9} = 3cm$

Area of triangle = $\frac{8 \times 3}{2} = 12cm^2$

Area of rectangle = $4 \times 8 = 32cm^2$

Total area = $32 + 12 = 44\ cm^2$

..... cm^2

(Total for Question 3 is 5 marks)

Answers to Qn 13 (AO1): (No Calc) 43% of students got this right

Question	Working	Answer	Mark	Notes
1 (c)		$\frac{1}{9}$	B1	for $\frac{1}{9}$ (or 0.11…)

Answers to Qn 14 (AO2): (No Calc) 43% of students got this right

Question	Working	Answer	Mark	Notes
4		50	P1	for equating opposite angles to give an equation in x, e.g. $3x + 10 = 5(x - 10)$
			P1	for expanding the bracket and rearranging terms in x and number terms on opposite sides of the equation, e.g. $5x - 3x = 10 + 50$ $(x = 30)$
			P1	(dep on 1st P1) for substituting their value of x (= 30) into one of the angles, e.g. $3 \times 30 + 10$ or $5(30 - 10)$ (= 100)
			A1	cao

Answers to Qn 15 (AO1): 42% of students got this right

19(a)	4	B1	
	Additional Guidance		

19(b)	2 + 3 2 + 3 2 + 9	M1	Allow one error
	11 + 6 2	A1	
	Additional Guidance		

Answers to Qn 16 (AO1): 41% of students got this right

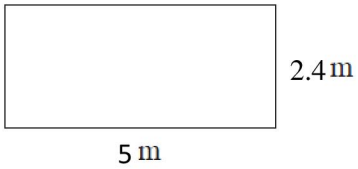
13.			75π	3	M1 for $(4 \times \pi \times 5^2) \div 2$ (or equivalent) M1 for $\pi \times 5^2$ (or equivalent) A1 for 75π (accept 235.5)

Answers to Qn 17 (AO1): 40% of students got this right

15	$2x + \frac{1}{x}$	B1	

Answers to Qn 18 (AO3): (No Calc) 40% of students got this right

5a The diagram shows a rectangular floor.



Felix is going to cover the floor with rectangular tiles.
Each tile is 50 cm by 40 cm.
$\frac{1}{6}$ of the tiles will be orange.
Some of the tiles will be purple.
The rest of the tiles will be red.

The ratio of the number of purple tiles to the number of red tiles will be 1 : 4

(a) Assuming there are no gaps between the tiles, how many tiles of each colour will Felix need?

Floor length = 5m = 500cm so can fit $\frac{500}{50} = 10$ tiles

Floor width = 2.4m = 240 cm so can fit $\frac{240}{40} = 6$ tiles

Total no. of tiles = $10 \times 6 = 60$ tiles

No. of orange tiles = $\frac{1}{6} \times 60 = 10$ tiles

Remaining tiles = 60-10=50

Purple : red $\quad 50 \div (1 + 4) = 50 \div 5 = 10$

$1 : 4$

$10 : 40$

So Felix needs <u>10 orange tiles, 10 purple tiles and 40 red tiles</u>

orange tiles .....10.....

purple tiles ..... 10..... ..

red tiles ..... 40.....

(5)

Answers to Qn 19 (AO2): (No Calc) 37% of students got this right

4 On Tuesday, Thyreece travelled by train from Leicester to Bristol.

Thyreece's train left Leicester at 09 45
It got to Bristol at 12 15
The train travelled at an average speed of 110 miles per hour.

On Thurday, Gisella travelled by train from Leicester to Bristol.

Gisella's train also left at 09 45 but was diverted.
The train had to travel an extra 37 miles.
The train got to Bristol at 12 45

Work out the difference between the average speed of Thyreece's train and the average speed of Gisella's train.

Thyreece:

Time taken: 12:15 – 09:45 : 2 hrs 30 mins = 2.5 hrs

Average speed = $\frac{distance}{time}$ = 110 mph

Distance = $110 \times 2.5 = 275$ miles

Gisella:

Distance = 275 + 37 = 312 miles

Time taken = 3 hrs

Average speed= $\frac{distance}{time}$ = $\frac{312}{3}$ = 104 mph

Difference = 110 – 104 = 6 mph

..... miles per hour

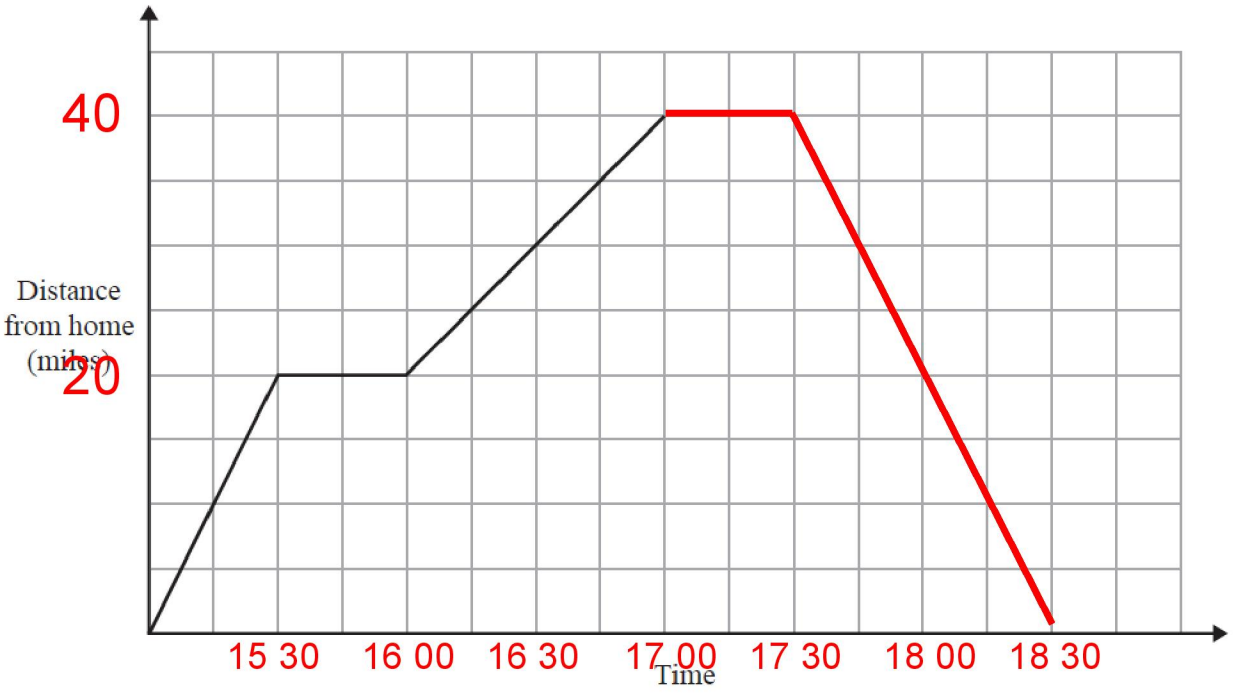
(Total for Question 4 is 4 marks)

Answers to Qn 20 (AO1): 37% of students got this right

12.	(a)	$\frac{(x+4)(x-1)}{(2x-3)(x-1)}$	$\frac{x+4}{2x-3}$	3	M1 for $(x + 4)(x - 1)$ M1 for $(2x - 3)(x - 1)$ A1 cao

Answers to Qn 21 (AO2): 36% of students got this right

6 On Tuesday Rihanna delivered a package to a hotel.
The travel graph represents Rihanna's journey to the hotel.



Rihanna left home at 15 00
She drove for 30 minutes at a constant speed of 40 mph.
She then stopped for a break.

Rihanna then drove to the hotel at a constant speed.
She was at the hotel for 30 minutes.
She then drove home at a constant speed of 35 mph.

Show that she does not arrive home before 18 30

30 mins = 0.5 hours
Distance travelled after 30 mins = $40 \times 0.5 = 20$ miles
So total distance to hotel = 40 miles

To arrive by 18 30 needs to travel 40 miles in 1 hr or at 40mph

So speed of 35 mph slower than 40 mph so she won't arrive by 18 30

OR : time to travel home $\frac{40}{35} = \frac{8}{7} = 1\frac{1}{7}$ hours which is more than 1 hour

Question Order Created by Pinpoint Learnings Automatic Differentiation Algorithmn

(Total for Question 6 is 4marks)

Answers to Qn 22 (AO2): 34% of students got this right

16.		$360 - y$	$180 - \frac{y}{2}$	4	M1 $ADC = \frac{y}{2}$ A1 $180 - \frac{y}{2}$ C2 (dep on M1) for both reasons Angle at centre is twice the angle at the circumference Opposite angles in cyclic quadrilateral add to 180° (C1 (dep on M1) for one appropriate circle theorem reason) **OR** M1 reflex $AOC = 360 - y$ A1 $\frac{360 - y}{2}$ oe C2 (dep on M1) for both reasons Angles around a point add up to 360° Angle at centre is twice the angle at the circumference (C1 (dep on M1) for one appropriate circle theorem reason)

Answers to Qn 23 (AO1): 32% of students got this right

12.	(b)	$\frac{4(x-2)}{(x+2)(x-2)}+\frac{3(x+2)}{(x+2)(x-2)}$	$\frac{7x-2}{(x+2)(x-2)}$	3	M1 for denominator $(x+2)(x-2)$ (or equivalent) **or** x^2-4 M1 for $\frac{4(x-2)}{(x+2)(x-2)}$ (or equivalent) **or** $\frac{3(x+2)}{(x+2)(x-2)}$ (or equivalent) (NB. The denominator must be $(x+2)(x-2)$ **or** x^2-4 **or** another suitable common denominator) A1 for $\frac{7x-2}{(x+2)(x-2)}$ **or** $\frac{7x-2}{x^2-4}$ SC: If no marks awarded then award B1 for $\frac{4(x-2)}{x^2-2}+\frac{3(x+2)}{x^2-2}$ (or equivalent)

Answers to Qn 24 (AO1): 30% of students got this right

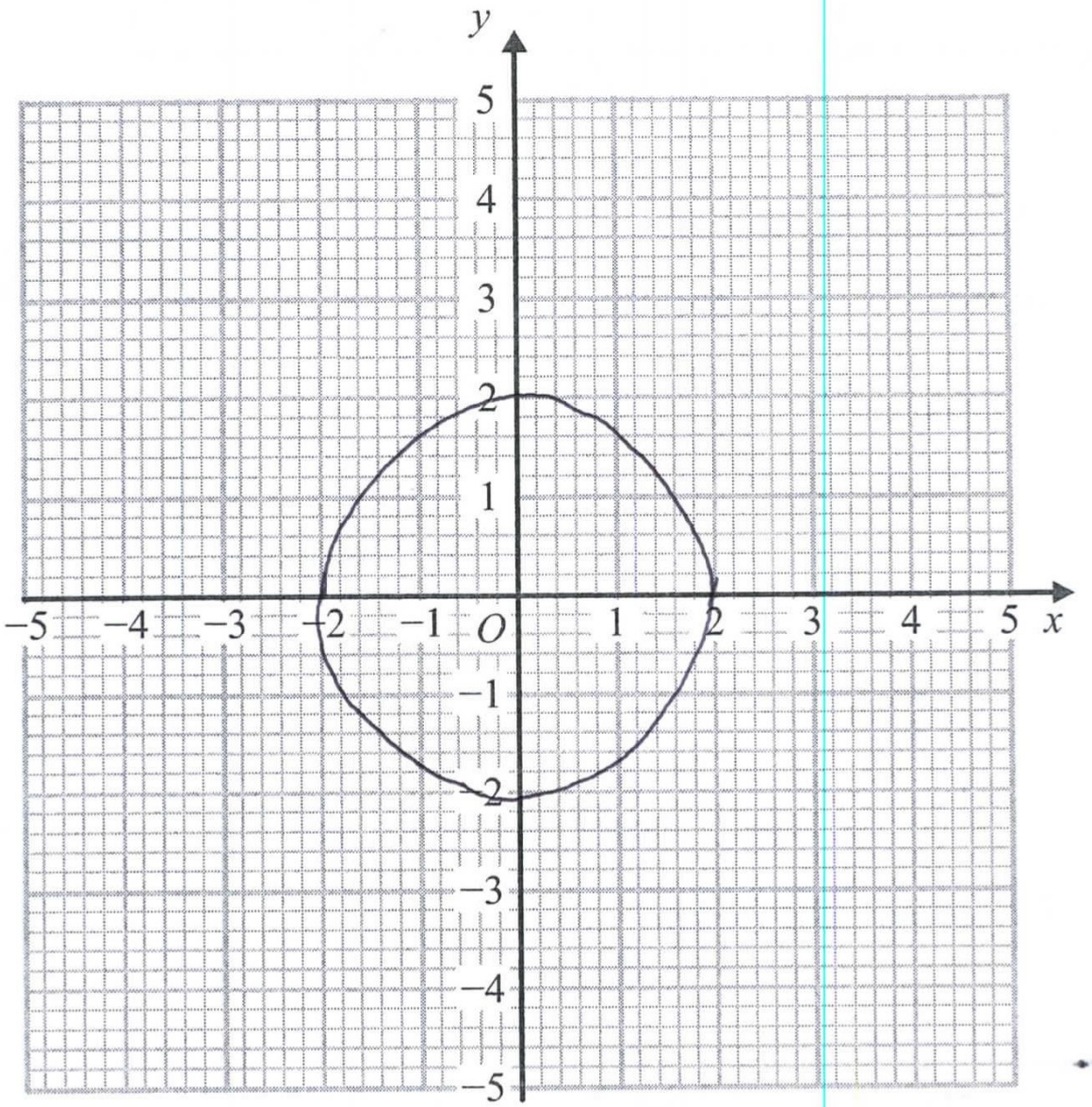
16	A	B1	$19^2 = 361 \rightarrow 400$ (no other working)

Answers to Qn 25 (AO1): 29% of students got this right

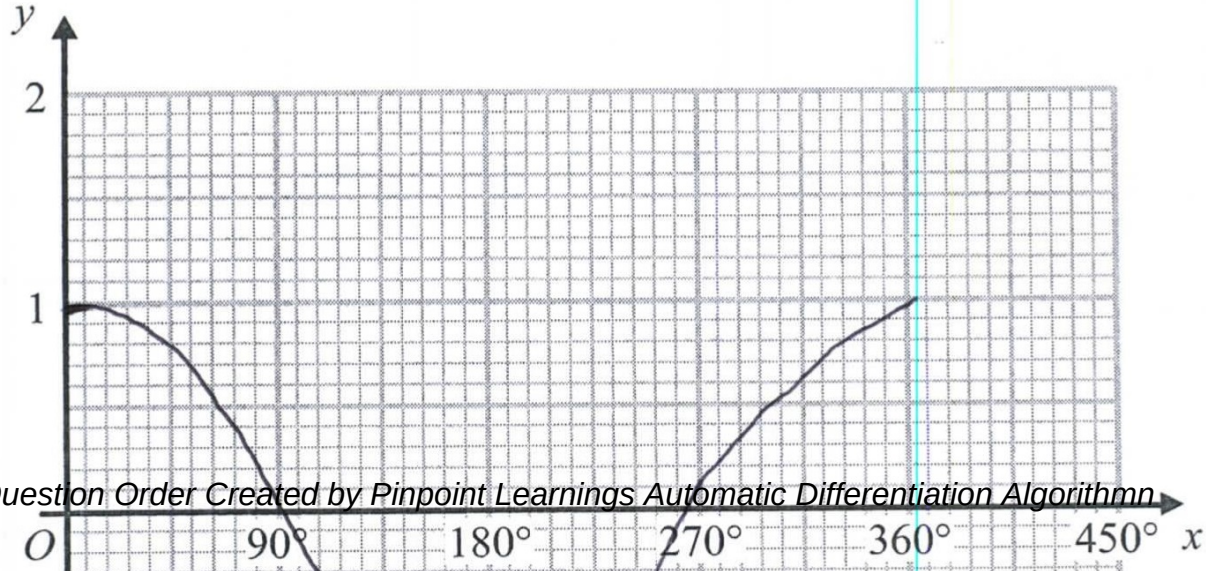
Paper 1MA1: 1H			
Question	**Working**	**Answer**	**Notes**
12		Complete proof	M1 Begins proof *BAE=ACD* and *ABE=EDC* M1 *AB = DC* because opposite sides of a parallelogram are equal C1 Completes proof with all reasons eg alternate angles are equal and reference to ASA

Ext ANSWERS 1 (AO1): (No Calc) Only 23% of students got this rigl

27



(a) On the grid, draw the graph of $x^2 + y^2 = 4$



Ext ANSWERS 2 (AO3): Only 23% of students got this right(1 mark

10 Find the value of $16^{-\frac{3}{4}}$

$$16^{-\frac{3}{4}} = \left(\frac{1}{16}\right)^{\frac{3}{4}} = \left(\frac{1}{\sqrt[4]{16}}\right)^{3} = \left(\frac{1}{2}\right)^{3} = \frac{1}{8}$$

..... $1/8$.....

(Total for Question 10 is 1 mark)

Ext ANSWERS 3 (AO1): Only 23% of students got this right(3 mark

Question		Working	Answer	Mark	Notes
18.			Vertices at (–6, 7) (–3 , 7) (–3, 1)	3	B3 fully correct (B2 correct orientation **and** correct size **or** two correct vertices) (B1 correct size **or** correct orientation **or** one correct vertex)