ADA PINPOINT PACKS

66_to_100_Percent_Pinpoint_AI_Pack

Made for Grade5

AO1,2_and_3

ALL_Strands

Calc_Only

Created by A.D.A:

Pinpoints Automatic Differention Algorithmn

Designed and Programmed by

Tom Quilter, Anne Mcateer + Jon Hargreaves ... All maths teachers.

Question 1 (AO1): 33% of students got this right

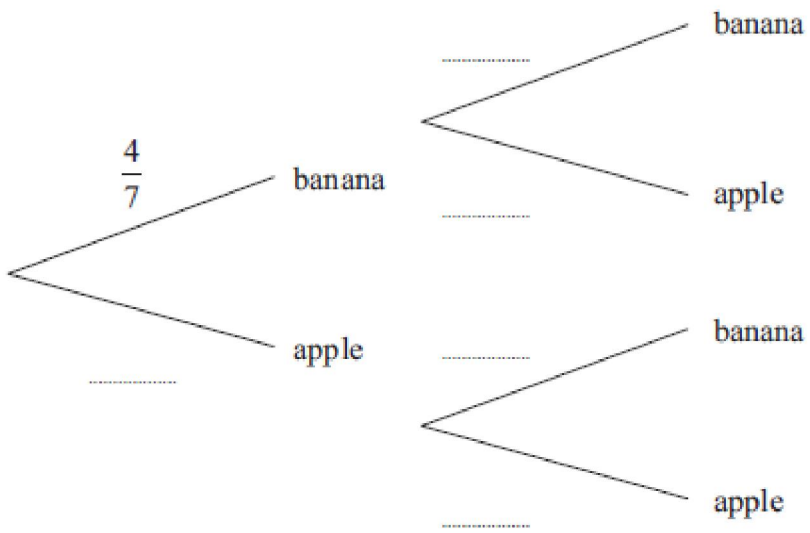
26 (*c*) Calculate $(4.515 \times 10^6) \div (3.01 \times 10^{-2})$
Give your answer in standard form.

Question 2 (AO1): 31% of students got this right

22. There are 4 banana smoothies and 3 apple smoothies in a box.

Jenny takes at random 1 smoothie from the box.
She writes down its flavour, and puts it back in the box.
Jenny then takes at random a second smoothie from the box.

(*a*) Complete the probability tree diagram.



(2)

(*b*) Work out the probability that both smoothies are apple flavour.

.....

(2)

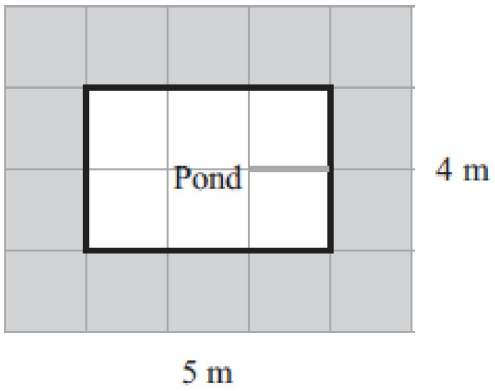
(Total 4 marks)

Question 3 (AO2): 31% of students got this right

16. Priyesh has 12 square paving stones.
He will use all the stones to make a patio that is a rectangle.

(a) Draw a diagram to show how Priyesh can use these stones to make a patio that is a rectangle.

The diagram shows a pond with a path around it.



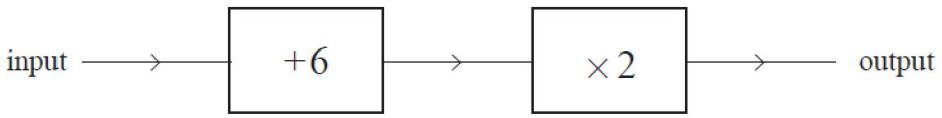
(b) (i) Work out the perimeter of the pond.

(ii) Work out the area of the path.

Question 4 (AO2): 29% of students got this right

11b

Here is a number machine.



Abbie says that when the output is 18 the input is 24

Here is her working.

18 – 6 = 12
12 × 2 = 24

Abbie is wrong.

(b) Explain what she has done wrong.

.....

.....

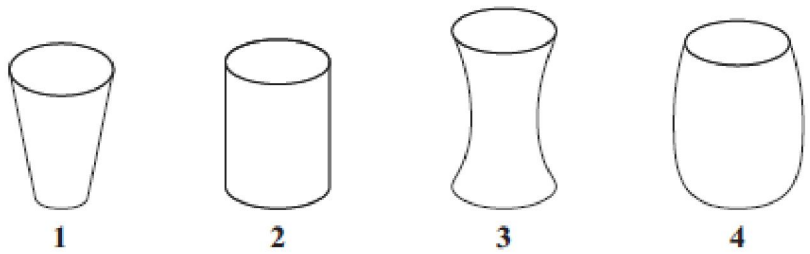
.....

.....

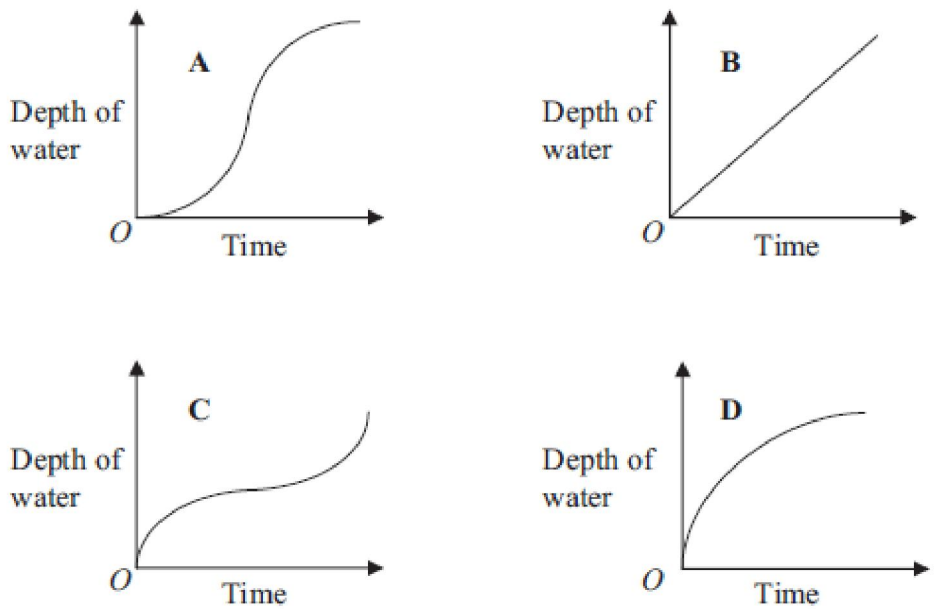
(2)

Question 5 (AO2): 28% of students got this right

20. Here are four containers.
Water is poured into each container at a constant rate.



Here are four graphs.
The graphs show how the depth of the water in each container changes with time.



Match each graph with the correct container.

A and .....

B and .....

C and .....

D and .....

(Total 2 marks)

Question 6 (AO1): 28% of students got this right

23. 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.

.....

(2)

(*b*) Is 150 a term of this sequence?

You must explain how you get your answer.

.....

.....

.....

.....

.....

(2)

(Total 4 marks)

Question 7 (AO1): 27% of students got this right

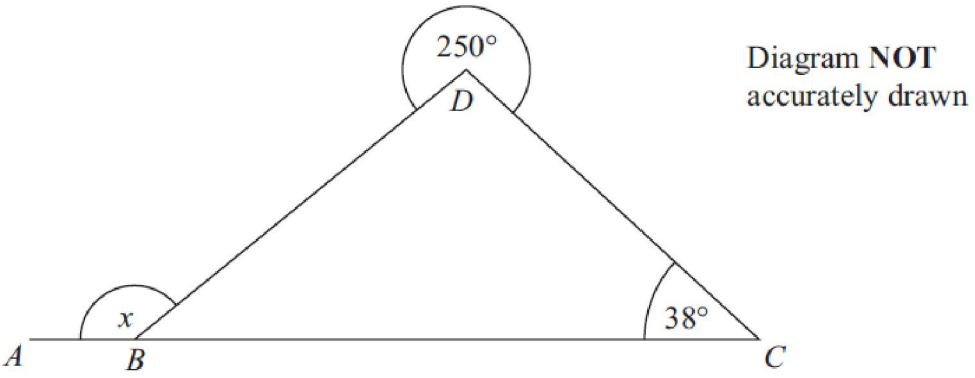
16 The table shows information about the number of children in each of 40 families.

Number of children	Frequency
0	6
1	13
2	12
3	7
4	2
5 or more	0

(*a*) Find the median number of children.

Question 8 (AO2): 26% of students got this right

17.



ABC is a straight line.
Angle *BCD* = 38°
The reflex angle *BCD* = 250°

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

(Total 4 marks)

Question 9 (AO3): 25% of students got this right

18. Suha Industries make drink containers.

They need to design a new container for 500 ml of drink.

The container has to be in the shape of a cuboid.
The base of the cuboid will be a square.
The square has sides of length 5 cm.

Work out the minimum height of the container.

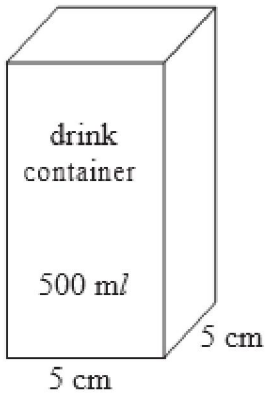


Diagram **NOT** accurately drawn

..... cm

(Total 3 marks)

Question 10 (AO1): 23% of students got this right

21. A factory makes metal bottle tops.

When a bottle top is too big or too small it does not fit the bottle.

The probability that a bottle top is too big is 0.008
The probability that a bottle top is too small is 0.015

A bottle top is taken at random.

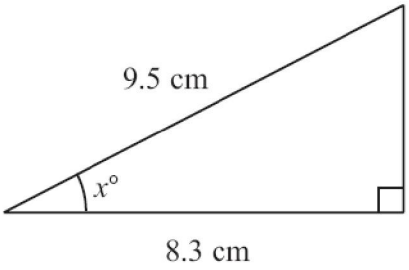
Work out the probability that the bottle top **does** fit the bottle.

.....

(Total 2 marks)

Question 11 (AO1): 22% of students got this right

21.



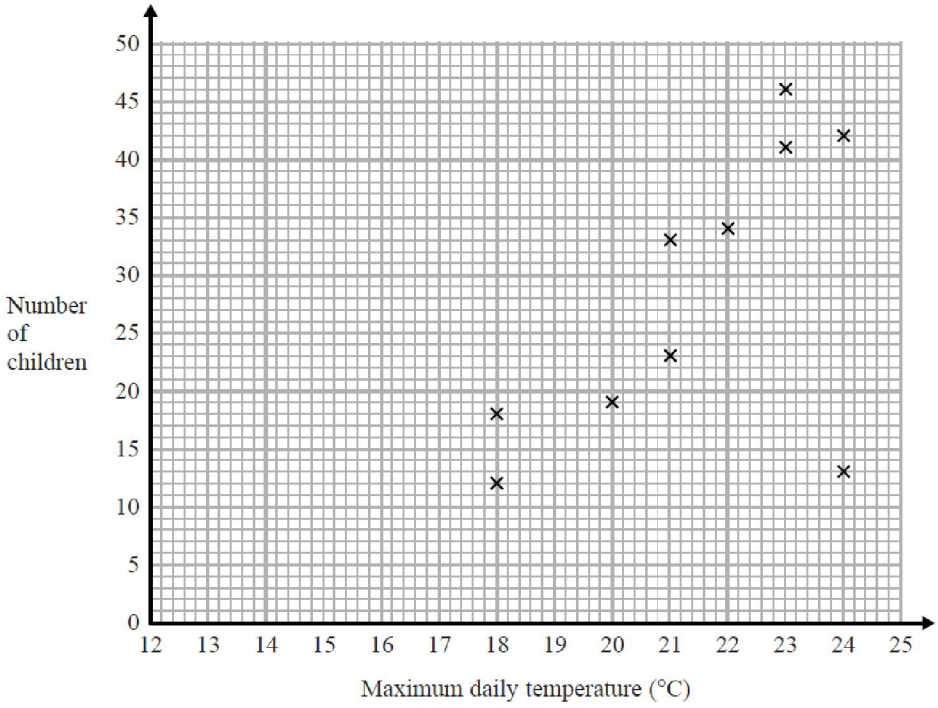
Work out the value of x.
Give your answer correct to 1 decimal place.

x = ...

(Total 3 marks)

Question 12 (AO2): 21% of students got this right

25d Johan records the maximum daily temperature each day for 10 days.
He also records the number of children going to a park for each of these days.
He draws this scatter graph for his information.



It would not be sensible to use the scatter graph to predict the number of children going to the park on a day when the maximum daily temperature was 15°C.

(d) Give a reason why.

.....

.....

.....

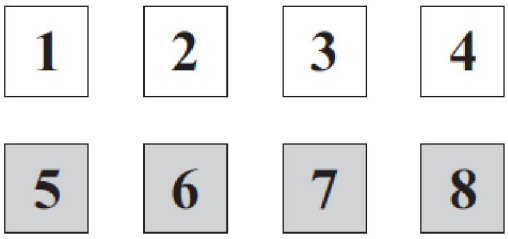
(1)

Question 13 (AO1): 20% of students got this right

24 (*a*) Solve $2x^2 = 72$

Question 14 (AO1): 19% of students got this right

15. Mark has 4 white cards and 4 grey cards.
There is a number on each card, as shown below.



Mark mixes up the white cards.
He puts the cards on the table so that the numbers are hidden.

Mark mixes up the grey cards.
He puts the cards on the table so that the numbers are hidden.

Mark and Jean play a game with all of these cards.

Mark asks Jean to take at random one white card and one grey card.

Jean wins the game when the numbers on the two cards add up to more than 9

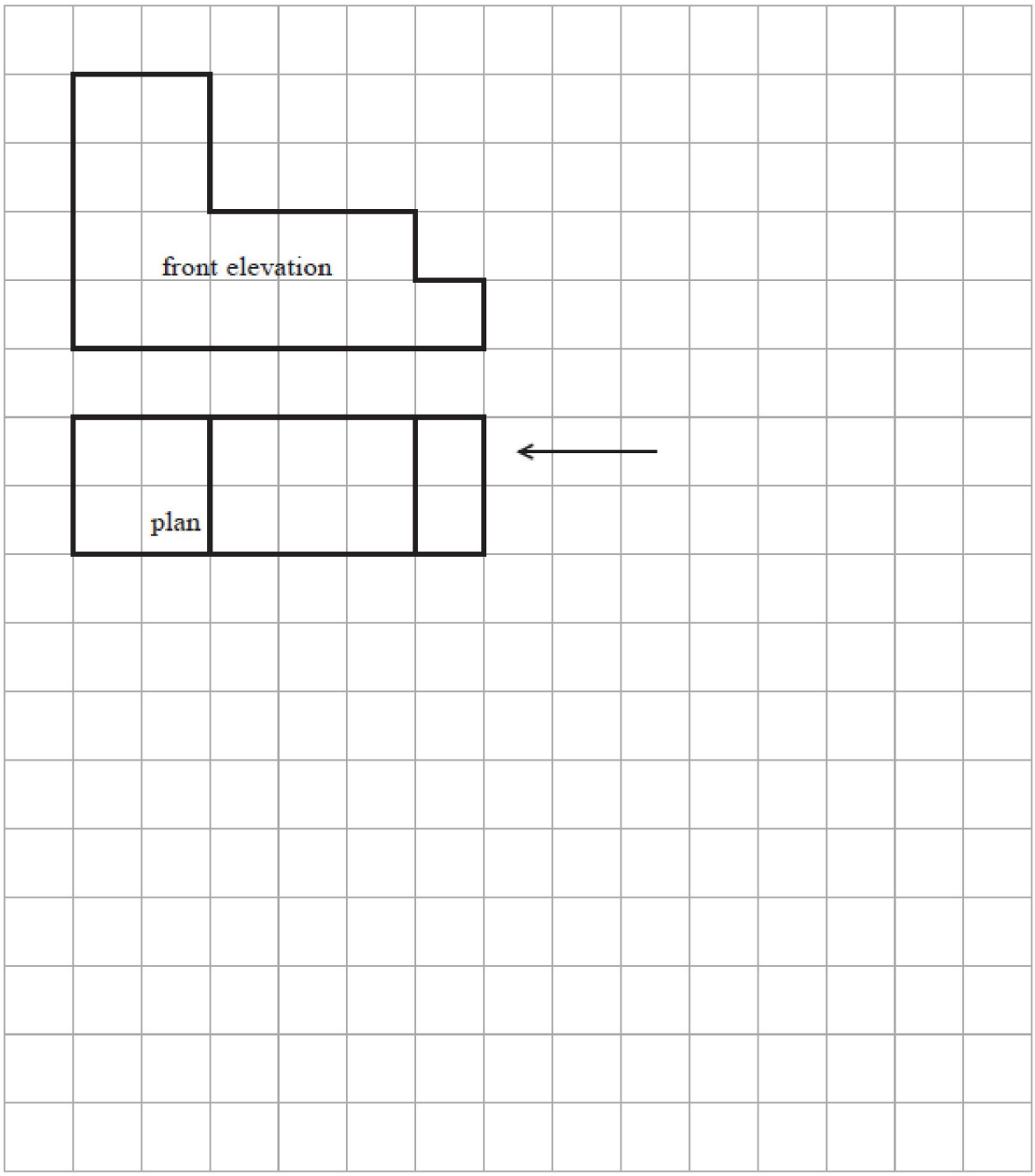
Mark and Jean are going to play this game 80 times.
Mark will mix up the white cards and mix up the grey cards after each game.

(b) Estimate the number of games that Jean will win.

.....
(3)

Question 15 (AO1): 18% of students got this right

27. The front elevation and plan of a solid are shown on the grid.
On the grid, draw the side elevation from the direction of the arrow.



(Total for Question 27 is 2 marks)

Question 16 (AO1): 17% of students got this right

20 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

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

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

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

Draw a Venn diagram for this information.

Question 17 (AO1): 16% of students got this right

17. (*b*) Make a the subject of the formula $v = u + at$

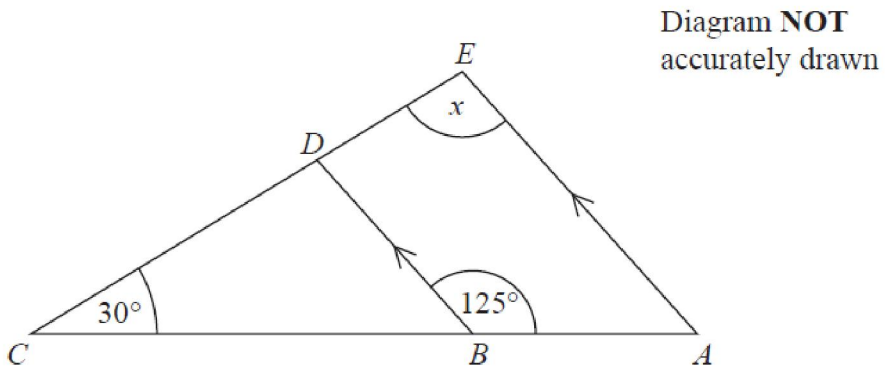
.....

(2)

(Total 4 marks)

Question 18 (AO2): 16% of students got this right

18.



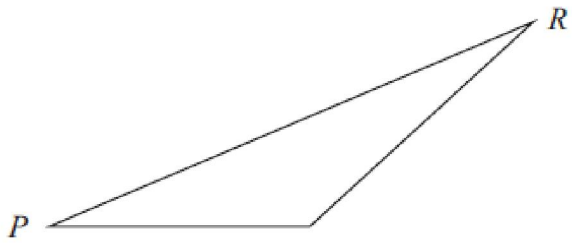
ABC and *EDC* are straight lines.
AE and *BD* are parallel.
Angle *ABD* = 125°
Angle *BCD* = 30°

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

(Total 4 marks)

Question 19 (AO3): 15% of students got this right

14. Here is a scale drawing of a field.



Scale: 1 cm represents 3 m.

Harry is going to plant some bushes on the side *PR*.
He is going to plant the first bush at *P*.

The bushes will be 2 m apart.
The cost of each bush is £11.99

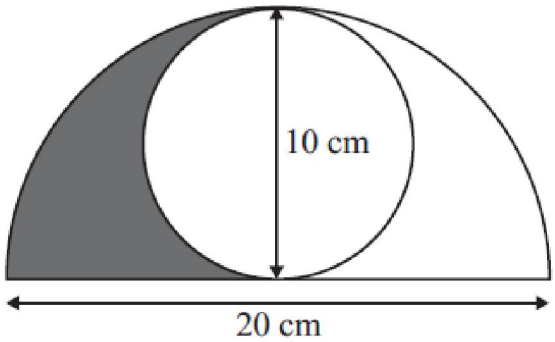
Work out the total cost of the bushes on the side *PR*.

£.....

(Total 5 marks)

Question 20 (AO3): 14% of students got this right

19. The diagram shows a circle inside a semicircle.



The circle has a diameter of 10 cm.
The semicircle has a diameter of 20 cm.

Work out the area shaded.
Give your answer correct to 1 decimal place.

Question 21 (AO1): 12% of students got this right

17 (b) Factorise $6m^2 + 3m$

.....

(1)

Question 22 (AO3): 11% of students got this right

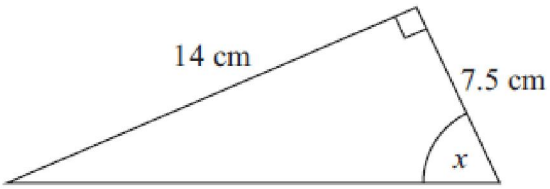
13 The size of the largest angle in a triangle is 4 times the size of the smallest angle.
The other angle is 27° less than the largest angle.

Work out, in degrees, the size of each angle in the triangle.
You must show your working.

(Total for Question 13 is 5 marks)

Question 23 (AO1): 11% of students got this right

25. Here is a right-angled triangle.



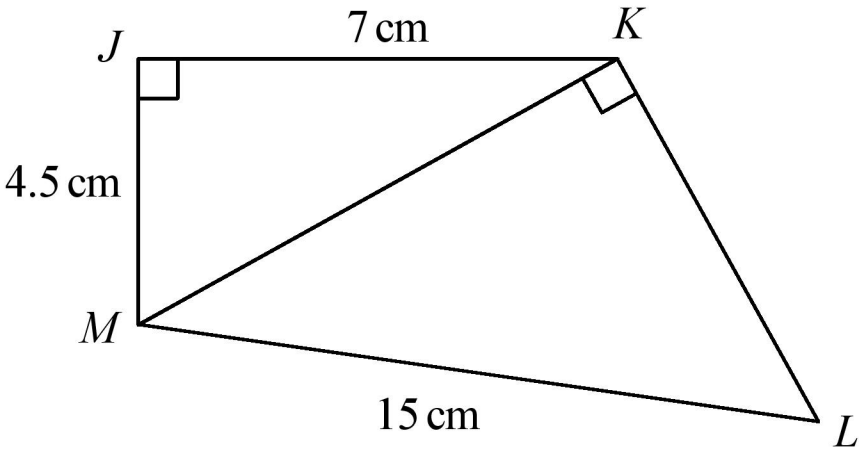
Work out the size of the angle marked *x*.
Give your answer to the nearest degree.

.....°

(Total 3 marks)

Question 24 (AO3): 10% of students got this right

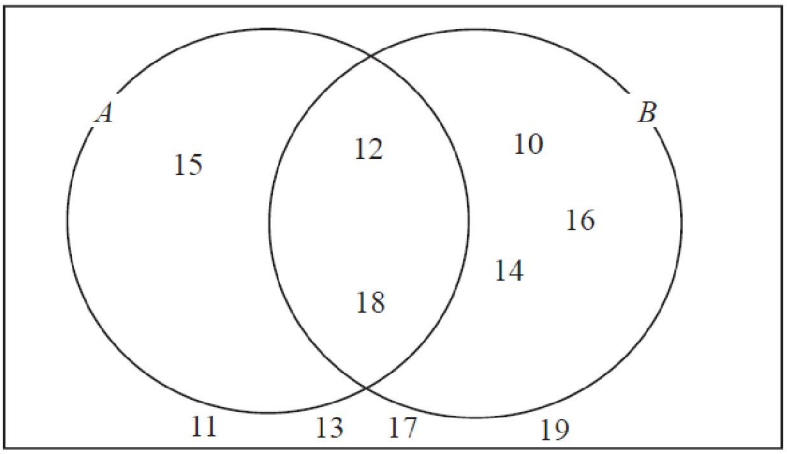
24 The diagram shows a quadrilateral *JKLM*.



Work out the size of angle *KLM*.
Give your answer correct to 3 significant figures.

Question 25 (AO1): 9% of students got this right

26 Here is a Venn diagram.



(*a*) Write down the numbers that are in set

(i) $A \cup B$

(ii) $A \cap B$

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

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

Question 26 (AO2): 7% of students got this right

17 3 of the 25 women have a shoe size of 7.

Zoe says that if you choose at random one of the 25 women, the probability that she has either a shoe size of 7 or a dress size of 14 is $\frac{9}{25}$ because

$$\frac{3}{25}+\frac{6}{25}=\frac{9}{25}$$

(*b*) Is Zoe correct?
You must give a reason for your answer.

(1)

(Total for Question 17 is 2 marks)

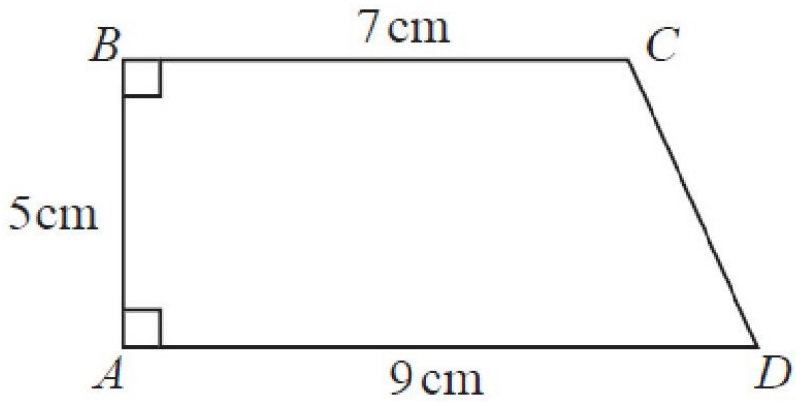
Question 27 (AO1): 6% of students got this right

24. Solve $x + 2y = 3$

$x - y = 6$

Question 28 (AO3): 5% of students got this right

28 *ABCD* is a trapezium.

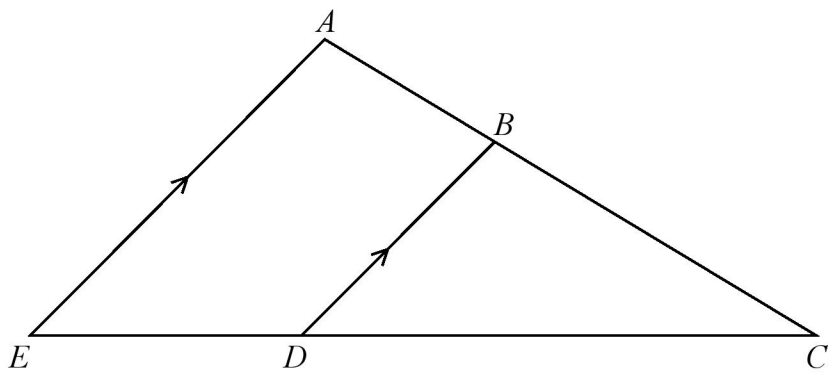


A square has the same perimeter as this trapezium.

Work out the area of the square.
Give your answer correct to 3 significant figures.

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

21



ABC and *EDC* are straight lines.
EA is parallel to *DB*.

EC = 8.1 cm.
DC = 5.4 cm.
DB = 2.6 cm.

(*a*) Work out the length of *AE*.

cm
(2)

AC = 6.15 cm.

(*b*) Work out the length of *AB*.

cm
(2)

(Total for Question 21 is 4 marks)

Answers to Qn 1 (AO1): 33% of students got this right

Question	Working	Answer	Mark	Notes
26 (c)		1.5×10^8	M1 A1	for 150 000 000 or 1.5×10^n where $n \neq 8$ cao

Answers to Qn 2 (AO1): 31% of students got this right

Question		Working	Answer	Mark	Notes
22.	(a)		$\frac{3}{7}, \frac{4}{7}, \frac{3}{7}, \frac{4}{7}, \frac{3}{7}$	2	B2 Fully correct tree (B1 $\frac{3}{7}$ on first branch)
	(b)	$\frac{3}{7} \times \frac{3}{7}$	$\frac{9}{49}$	2	M1 ft for '$\frac{3}{7}$' $\times$ '$\frac{3}{7}$' provided $0 <$ '$\frac{3}{7}$' <1 A1 ft for $\frac{9}{49}$ oe

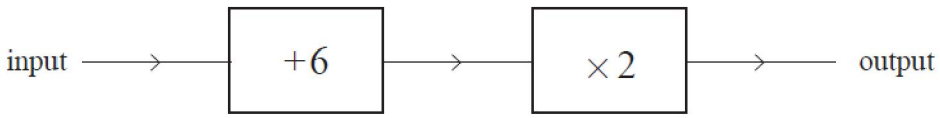
Answers to Qn 3 (AO2): 31% of students got this right

Question		Working	Answer	Mark	Notes
16	(a)		correct arrangement shown	2	B2 twelve stones shown in a rectangle (ok if pond in the middle) or a rectangle with correctly labelled sides (B1 for rectangle drawn or 12 stones used)
	(b)(i)		10	3	B1 cao
	(ii)		14m²		B1 for 14 B1 for m²

Answers to Qn 4 (AO2): 29% of students got this right

11b

Here is a number machine.



Abbie says that when the output is 18 the input is 24

Here is her working.

18 – 6 = 12
12 × 2 = 24

Abbie is wrong.

(b) Explain what she has done wrong.

The order of operations is not correct. The inverse of × 2 is not used

Answers to Qn 5 (AO2): 28% of students got this right

Question		Working	Answer	Mark	Notes
20			A and 3 B and 2 C and 4 D and 1	2	B2 for all 4 correct (B1 for 2 correct)

Answers to Qn 6 (AO1): 28% of students got this right

		23. (a)	$7n - 4$	2	B2 for $7n - 4$ (B1 for $7n + d$ where d is an integer)
		(b)	explanation	2	M1 for '$7n - 4$' = 150 **or** any other valid method, e.g. counting on 7s (to get 150) A1 for a complete explanation e.g. the 22nd term is 150 or $n = 22$ from solution of equation or a clear demonstration based on 22 or complete sequence

Answers to Qn 7 (AO1): 27% of students got this right

Question	Working	Answer	Mark	Notes
16 (a)		2	B1	cao

Answers to Qn 8 (AO2): 26% of students got this right

17.			148°	4	M1 for (angle *BDC* =) 360 – 250 (=110) M1 (dep) for 180 – (180 – '110' – 38) (= 148) or for '110' + 38 (= 148) C2 (dep on M2) for $x = 148$ with full reasons, relevant to the complete correct method used, for example: Angles at a point add up to 360° **and** angles in a triangle add up to 180° **and** angles on a straight line add up to 180°; Or Angles at a point add up to 360° **and** exterior angle of a triangle is equal to the sum of the interior opposite angles or (C1 (dep on at least M1) for one reason relevant to correct method)

Answers to Qn 9 (AO3): 25% of students got this right

18.			20	3	M1 for establishing the volume of the container is 500 cm^3 M1 for "500" ÷ (5 × 5) A1 cao

Answers to Qn 10 (AO1): 23% of students got this right

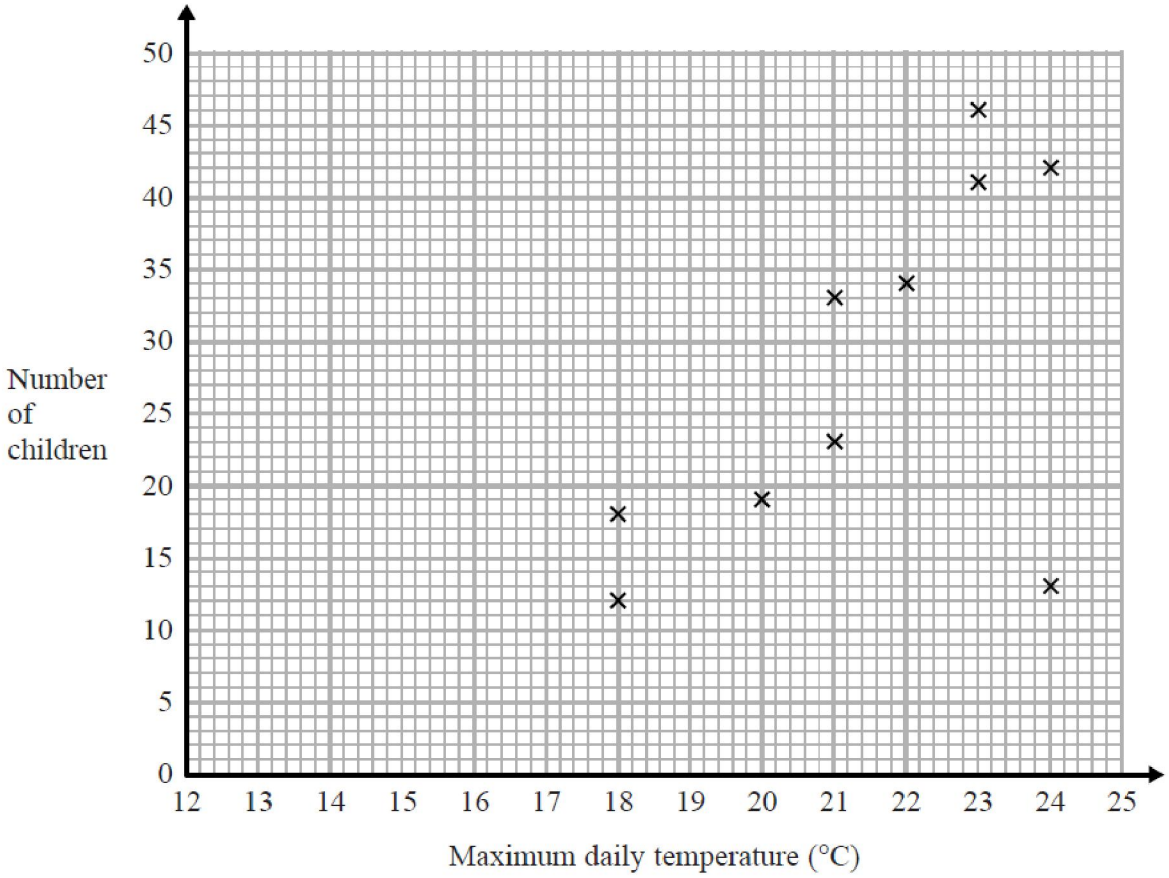
Question		Working	Answer	Mark	Notes
21		1 – (0.008 + 0.015)	0.977	2	M1 for 1 – (0.008 + 0.015) oe A1 for 0.977 oe

Answers to Qn 11 (AO1): 22% of students got this right

	21.	use of cos cos ("x") = $\frac{8.3}{9.5}$ (=0.87…) **or** ("x" =) $\cos^{-1}\left(\frac{8.3}{9.5}\right)$	29.1	3	M1 use of cosine (must be selected for use in trig ratio **NOT** cosine rule) **or** M2 for sin and $\frac{\sqrt{"21.36"}}{9.5}$ following correct Pythagoras **or** M2 for tan and $\frac{\sqrt{"21.36"}}{8.3}$ following correct Pythagoras **or** correct Pythagoras and then correct use of sine or cosine rule with "21.36" A1 for awrt 29.1, e.g. (29.1103…)

Answers to Qn 12 (AO2): 21% of students got this right

25d Jean records the maximum daily temperature each day for 10 days.
She also records the number of children going to a paddling pool for each of these days.
She draws this scatter graph for her information.



Jean's information for one of these days is an outlier on the scatter graph.

It would not be sensible to use the scatter graph to predict the number of children going to the paddling pool on a day when the maximum daily temperature was 13 °C.

(d) Give a reason why.

e.g. Data out of range, number of children will be negative

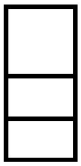
Answers to Qn 13 (AO1): 20% of students got this right

Part	Working or answer an examiner might expect to see	Mark	Notes
24 (a)	$2x^2 = 72$, $x^2 = 36$ $x = \sqrt{36}$ +6, –6	2	These marks are given for a pair of solutions (One mark is given for either +6 or –6)

Answers to Qn 14 (AO1): 19% of students got this right

15.	(b)	P(Jean wins) = $\frac{6}{16}$ $\frac{6}{16} \times 80$	1,5, 1,6, 1,7, 1,8, 2,5, 2,6, 2,7, 2,8, 3,5, 3,6, 3,7, 3,8, 4,5, 4,6, 4,7, 4,8 30	3	B1 for P(Jean wins) = $\frac{6}{16}$ oe M1 for '$\frac{6}{16}$' $\times$ 80 A1 cao

Answers to Qn 15 (AO1): 18% of students got this right

27		Elevation	B2 (B1)	Fully correct side elevation (a rectangle 4 high by 2 wide)

Answers to Qn 16 (AO1): 17% of students got this right

Paper 1MA1: 3F			
Question	**Working**	**Answer**	**Notes**
20		Venn diagram	M1 for two overlapping and labelled ovals M1 for 2 and 6 in the intersection M1 for 5 and 7 in the universal set only C1 for a fully correct Venn Diagram

Answers to Qn 17 (AO1): 16% of students got this right

17	(*b*)	$v - u = at$	$a = \frac{v-u}{t}$ oe	2	M1 A1

Answers to Qn 18 (AO2): 16% of students got this right

Question		Working	Answer	Mark	Notes
18			95° with reasons	4	M1 for angle *DBC* = 180 – 125 (= 55) **or** angle *EAC* = 180 – 125 (=55) (May be on diagram) A1 for *x* = 95 C2 (dep on M1) with full reasons for their given method, e.g. angles on a straight line add up to 180° **and** angles in a triangle add up to 180° **and** corresponding angles are equal **or** allied angles / co-interior angles add up to 180° **and** angles in a triangle add up to 180° (C1 (dep on M1) for one appropriate reason linked to parallel lines) M1 for angle *CDB* = 125 – 30 (= 95)) (May be on diagram) A1 for *x* = 95 C2 (dep on M1) for full reasons, for their given method, e.g. exterior angles are equal to the sum of the interior opposite angles **and** corresponding angles are equal (C1 (dep on M1) for one of these appropriate reasons linked to parallel lines)

Answers to Qn 19 (AO3): 15% of students got this right

Question		Working	Answer	Mark	Notes
14.			131.89	5	B2 for *PR* = 21 m (± 0.6 m) or at least 3 bushes 0.5 to 0.9 cm apart on *PR* (B1 for *PR* = 7cm (± 0.2 cm) or at least 3 bushes 1.8 to 2.2 cm apart on *PR*) M1 "21" ÷ 2 or for indication of 10 or 11 bushes (may be on diagram) M1 (dep on 2 marks earned previously) for '11' × 11.99 A1 cao

Answers to Qn 20 (AO3): 14% of students got this right

Question		Working	Answer	Mark	Notes
19		$\frac{\frac{1}{2}\times\pi\times10^2-\pi\times5^2}{2}$ = 12.5π	39.3	5	M1 for $\pi\times5^2$ (= 78.5(39…)) or $\pi\times10^2$ (= 314(.159…)) or 100π or 25π M1 for $\frac{1}{2}\times\pi\times10^2$ (= 157(.07…)) or 50π M1 (dep on at least one of the previous Ms) for $\frac{1}{2}\times\pi\times10^2-\pi\times5^2$ M1 (dep on previous M) for $(\frac{1}{2}\times\pi\times10^2-\pi\times5^2)\div2$ or $\frac{'157.07...'-'78.53....'}{2}$ or 25π/2 A1 for answer in range 39.2 – 39.3 OR M1 for $\pi\times5^2$ (= 78.5(39…)) or $\pi\times10^2$ (= 314(.159…)) or 100π or 25π M1 for $\frac{1}{4}\times\pi\times10^2$ (= 78.5(398…)) or 25π M1 for $\frac{1}{2}\times\pi\times5^2$ (= 39.2(69…)) or 12.5π M1(dep on 2 previous Ms) for ’78.5’ – ’39.2’ A1 for answer in range 39.2 – 39.3

Answers to Qn 21 (AO1): 12% of students got this right

17 (b) Factorise $6m^2 + 3m$

$3m\,(2m + 1)$

Answers to Qn 22 (AO3): 11% of students got this right

Paper: 1MA1/3F				
Question	**Working**	**Answer**	**Mark**	**Notes**
13		92, 65, 23	P1	for two of x, $4x$ and $4x - 27$ (where x is the smallest angle)
			P1	(dep) for equation summing their three angles to 180, eg $x + 4x + 4x - 27 = 180$
			P1	(dep P1) for correct process to simplify their algebraic expression, eg $9x - 27$ (=180)
			P1	for correct process to solve their equation of the form $ax + b = 180$
			A1	for three correct angles (order irrelevant)

Answers to Qn 23 (AO1): 11% of students got this right

25.		$\tan x = 14 \div 7.5$ $= 1.86666\ldots$ $\tan^{-1} 1.8666\ldots$	62	3	M1 for $\tan x = 14 \div 7.5$ (= 1.86666…) M1 for $\tan^{-1} (14 \div 7.5)$ A1 for answer in the range 61.7 to 62

Answers to Qn 24 (AO3): 10% of students got this right

Question	Working	Answer	Mark	Notes
24		33.7	P1	for starting to use Pythagoras, e.g. $4.5^2 + 7^2$
			P1	for complete process to find *KM*, e.g. $\sqrt{4.5^2 + 7^2}$ (= 8.321658489)
			P1	(dep P1) for a correct trigonometry statement, e.g. sin *KLM* = "8.32"…÷ 15
			A1	for answer in the range 33.6 to 33.7

Answers to Qn 25 (AO1): 9% of students got this right

Paper 1MA1: 2F			
Question	**Working**	**Answer**	**Notes**
26 (a)(i)		10, 12, 14, 15, 16, 18	B1 cao
(ii)		12, 18	B1 cao
(b)		$\frac{7}{10}$	M1 for 7 or indicating correct region or for 10, 14, 16, 11, 13, 17, 19 listed A1 for $\frac{7}{10}$ oe

Answers to Qn 26 (AO2): 7% of students got this right

Paper: 1MA1/3F				
Question	**Working**	**Answer**	**Mark**	**Notes**
17 (b)		Explanation	C1	No with statement about not being mutually exclusive events eg a person could be in both categories

Answers to Qn 27 (AO1): 6% of students got this right

Question		Working	Answer	Mark	Notes
24		$2y - -y = 3 - 6$ or $x + 2x = 3 + 12$	$x = 5, y = -1$	3	M1 for a complete method to eliminate one variable (condone one arithmetic error) A1 $x = 5$ A1 $y = -1$ NB: Candidates showing no working score 0 marks

Answers to Qn 28 (AO3): 5% of students got this right

Paper 1MA1: 2F			
Question	**Working**	**Answer**	**Notes**
28		43.5	P1 For process to establish a right-angled triangle with P1 two sides of 5 cm and 9 – 7 = 2 cm P1 For correct application of Pythagoras, P1 eg. 5^2 +"2"^{2} for a complete process to A1 find perimeter, eg. 9 + 7 + 5 + "5.39" (= 26.385...) for process to find area of square, eg. $(26.385... \div 4)^2$ for answer in range 43.5 to 43.6

Answers to Qn 29 (AO1): 3% of students got this right

Question 21 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$AE = \frac{8.1}{5.4} \times 2.6$	M1	This mark is given for a method to find the length *AE*
	3.9	A1	This mark is given for the correct answer only
(b)	$BC = 6.15 \times \frac{5.4}{8.1} = 4.1$ $AB = 6.15 - 4.1$	M1	This mark is given for a method to find the length *AB*
	2.05	A1	This mark is given for the correct answer only