ADA PINPOINT PACKS

52_to_70_Percent_Pinpoint_AI_Pack

Made for Grade5to7

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): 47% of students got this right

RETEST QUESTION

11 $a = 3b - 9$

(*d*) Make *b* the subject of this formula.

....
(2)
(Total 7 marks)

_____

Question 2 (AO2): 46% of students got this right

11. In the USA, Sam pays 20.88 US Dollars for 6 US gallons of petrol.
In Russia, Leon pays 800 Roubles for 25.58 litres of petrol.

Use the information in the table to compare the prices of petrol in the two countries.

1 US gallon = 3.79 litres
1 Euro = 40.63 Roubles
1 US Dollar = 0.77 Euros

(Total 5 marks)

_____

Question 3 (AO3): 45% of students got this right

7. Jarek uses the formula

$$\text{Area} = \frac{1}{2}ab\sin C$$

to work out the area of a triangle.

For this triangle,

$a = 7.8$ cm correct to the nearest mm.
$b = 5.2$ cm correct to the nearest mm.
$C = 63°$ correct to the nearest degree.

Calculate the lower bound for the area of the triangle.

.... cm^2

(Total 3 marks)

_____

Question 4 (AO2): 45% of students got this right

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

Diagram **NOT**
accurately drawn

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

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

Are there enough tables in the conference room?

(Total for Question 11 is 4 marks)

_____

Question 5 (AO1): 45% of students got this right

15.   f is a function such that

$$f(x) = \frac{1}{x^2 + 1}$$

(*a*) Find $f(\tfrac{1}{2})$

....
                                                     (1)

Question 6 (AO1): 44% of students got this right

7. (*a*) $A = \{p, r, a, g, u, e\}$

    $B = \{p, a, r, i, s\}$

    $C = \{b, u, d, a, p, e, s, t\}$

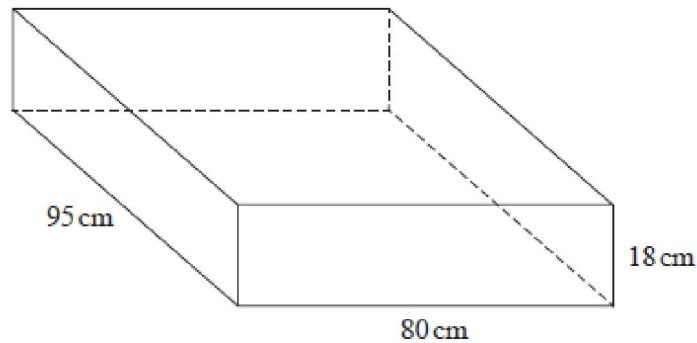   List the members of the set

    (i) $A \cap B$

    ....

    (ii) $B \cup C$

    ....

    (2)

Question 7 (AO3): 43% of students got this right

3. A sofa has 6 identical cushions.
Each cushion is a cuboid 18 cm by 80 cm by 95 cm.

The cushions are covered with a protective spray.
The protective spray is in cans.

The label on each can has this information.

Spray in this can covers 4 m^2

(a) Work out how many cans are needed to cover the 6 cushions with protective spray.

....

(5)

The information on each label is inaccurate.
The spray in each can covers 10% more than 4 m^2.

(b) How will this affect the number of cans needed for the 6 cushions?
You must show how you get your answer.

....

....

....

(2)

(Total for Question 3 is 7 marks)

Question 8 (AO2): 42% of students got this right

9   Ibrar bought a house for £145 000.

The value of the house depreciated by 4% in the first year.
The value of the house depreciated by 2.5% in the second year.

Ibrar says,

"$4 + 2.5 = 6.5$ so in two years the value of my house depreciated by 6.5%"

(*a*) Is Ibrar right?
        You must give a reason for your answer.

The value of Ibrar's house increases by x% in the third year.
At the end of the third year the value of Ibrar's house is £140 000.

(*b*) Work out the value of x.
        Give your answer correct to 3 significant figures.

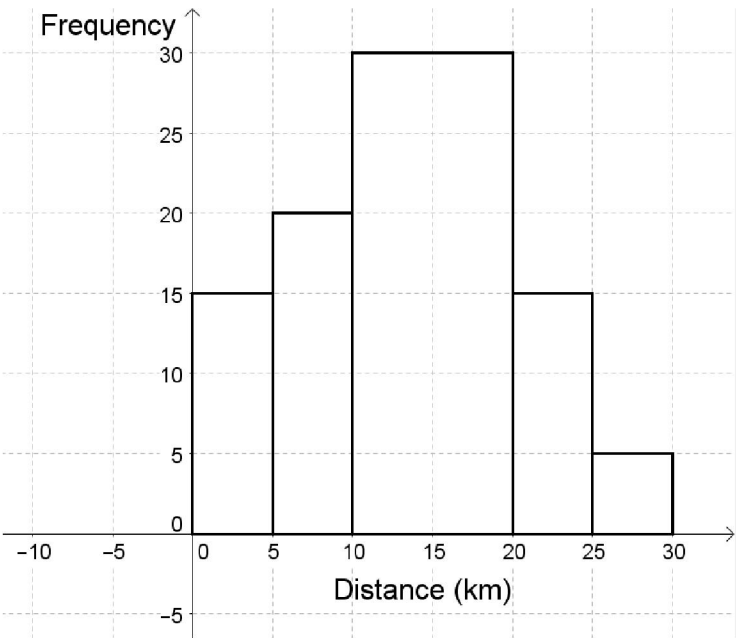Question 9 (AO1): 42% of students got this right

15. (*b*) Make *r* the subject of $5r + 1 = a(m + r)$

....

(3)

_____

Question 10 (AO1): 41% of students got this right

26 The histogram contains information about the distance a sample of people has to travel to work.

(*a*) Complete the frequency table using the histogram.

Distance (*x*) in km	Frequency
$0 < x \le 5$	30
$5 < x \le 10$	
$10 < x \le 20$	
$20 < x \le 25$	
$25 < x \le 30$	

(2)

Question 11 (AO1): 40% of students got this right

12. There are 24 girls and 12 boys in a club.

One girl and one boy are going to be chosen to go to a meeting.

Work out the total number of ways of choosing a girl and a boy.

....
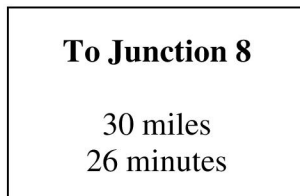
(Total for Question 12 is 2 marks)

_____

Question 12 (AO3): 40% of students got this right

*13. Axel and Lethna are driving along a motorway.

They see a road sign.
The road sign shows the distance to Junction 8
It also shows the average time drivers will take to get to Junction 8

> **To Junction 8**
>
> 30 miles
> 26 minutes

The speed limit on the motorway is 70 mph.

Lethna says,

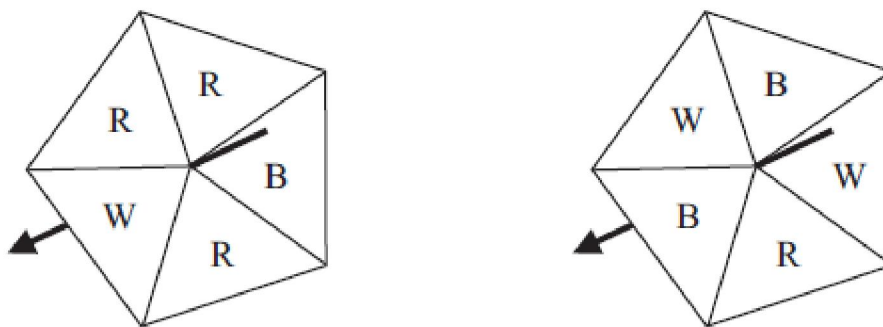> 'We will have to drive faster than the speed limit to go 30 miles in 26 minutes.'

Is Lethna right?
You must show how you got your answer.

Question 13 (AO2): 39% of students got this right

10. Simon wants to raise money for charity.
He designs a game for people to play.

Simon uses two fair 5-sided spinners for the game.

People spin each spinner once.
A person wins the game when both spinners land on the same letter.

People pay 40p for each game they play. The prize for a win is £1.

Work out if Simon is likely to raise any money for charity with his game.

Question 14 (AO1): 38% of students got this right

14. The table gives information about the temperature, $T\,°C$, at noon in a town for 50 days.

Temperature ($T\,°C$)	Frequency
$8 < T \leq 12$	6
$12 < T \leq 16$	8
$16 < T \leq 20$	13
$20 < T \leq 24$	21
$24 < T \leq 28$	2

(*a*) Write down the modal class interval.

....
(1)

(*b*) Calculate an estimate for the mean temperature.
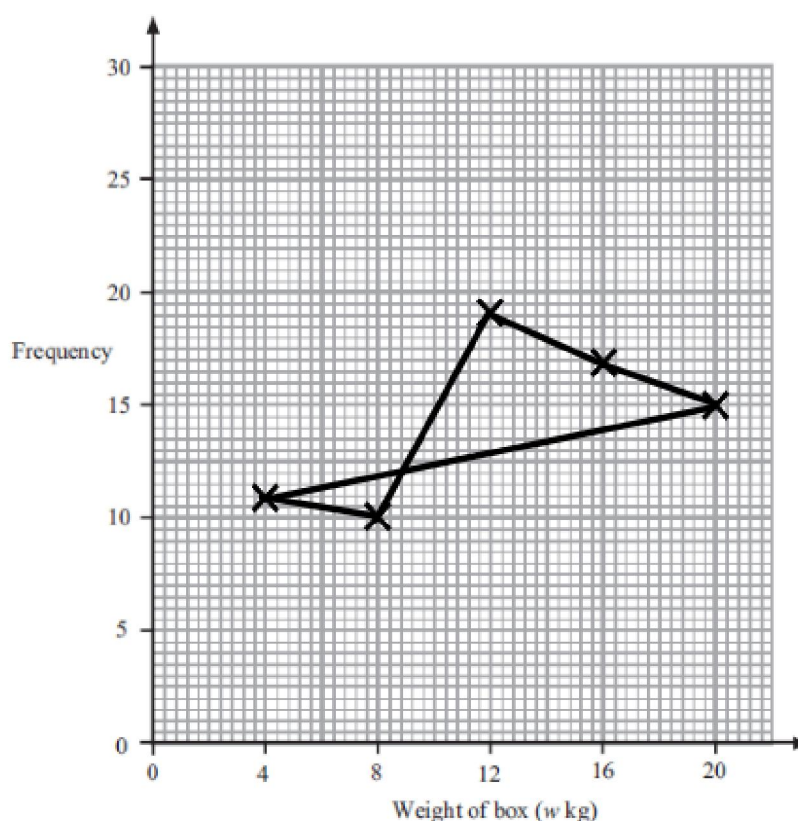
.... $°C$
(4)

Question 15 (AO2): 38% of students got this right

4   The table shows information about the weights of boxes.

Weight of box (w kg)	Frequency
$0 < w \le 4$	11
$4 < w \le 8$	10
$8 < w \le 12$	19
$12 < w \le 16$	17
$16 < w \le 20$	15

Bronagh drew this frequency polygon for the information in the table.
The frequency polygon is **not** correct.

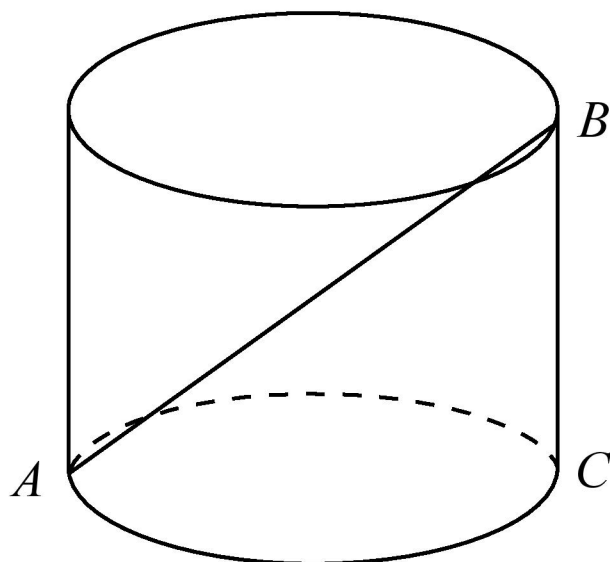Write down **two** things that are wrong with the frequency polygon.

1..

2..

Question 16 (AO3): 36% of students got this right

12   The diagram shows a metal rod, *AB*, resting inside a cylindrical tin.

The tin is on a horizontal table.
AC is a diameter of the base of the tin.
B is on the top edge of the tin.
BC is vertical.

The radius of the base of the tin is 5 cm.
The volume of the tin is 1178 cm^3.

Find the angle between the rod and the base of the tin.
Give your answer correct to the nearest degree.

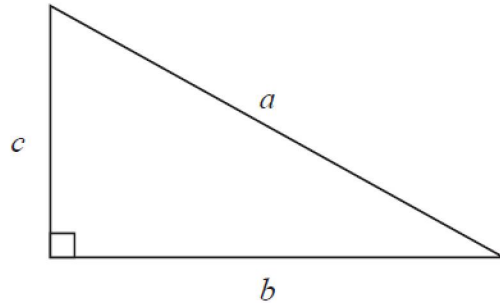# Question 17 (AO1): 36% of students got this right

15   The table shows information about the times a group of students took to do a park run.

Time taken (*t* minutes)	Frequency
$0 < t \leqslant 25$	20
$25 < t \leqslant 45$	35
$45 < t \leqslant 60$	45
$60 < t \leqslant 75$	87
$75 < t \leqslant 85$	10
$85 < t \leqslant 95$	8

On the page opposite, draw a histogram for this information.

Question 18 (AO3): 35% of students got this right

17

a is 8.3 cm correct to the nearest mm
b is 6.1 cm correct to the nearest mm

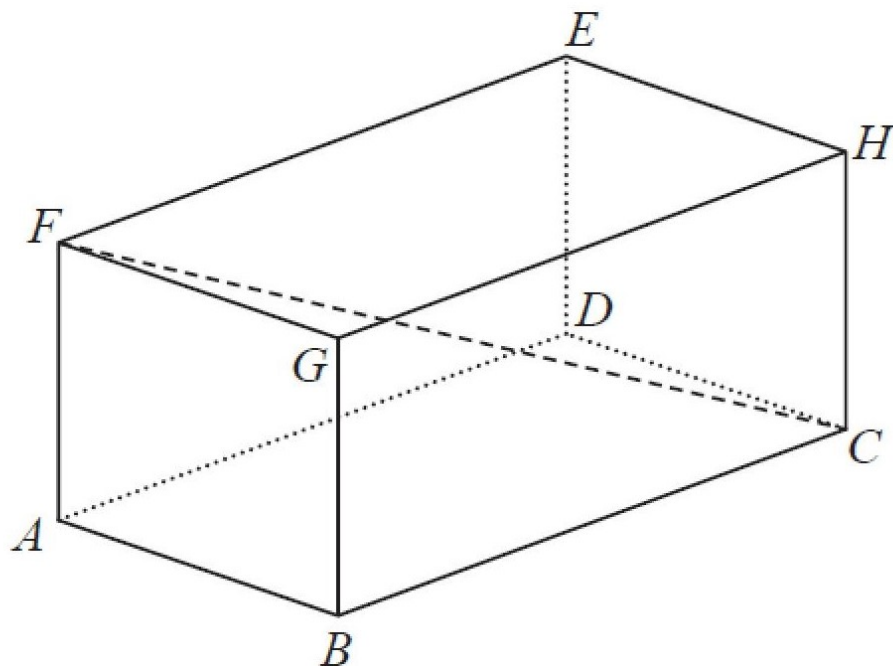Calculate the upper bound for *c*.
You must show your working.

Question 19 (AO1): 34% of students got this right

15   12 teams play in a competition.
Each team plays each other team exactly once.

(*b*) Work out the total number of games played.

Question 20 (AO3): 34% of students got this right

12   The diagram shows a cuboid *ABCDEFGH*.

$AB = 7$ cm, $AF = 5$ cm and $FC = 15$ cm.
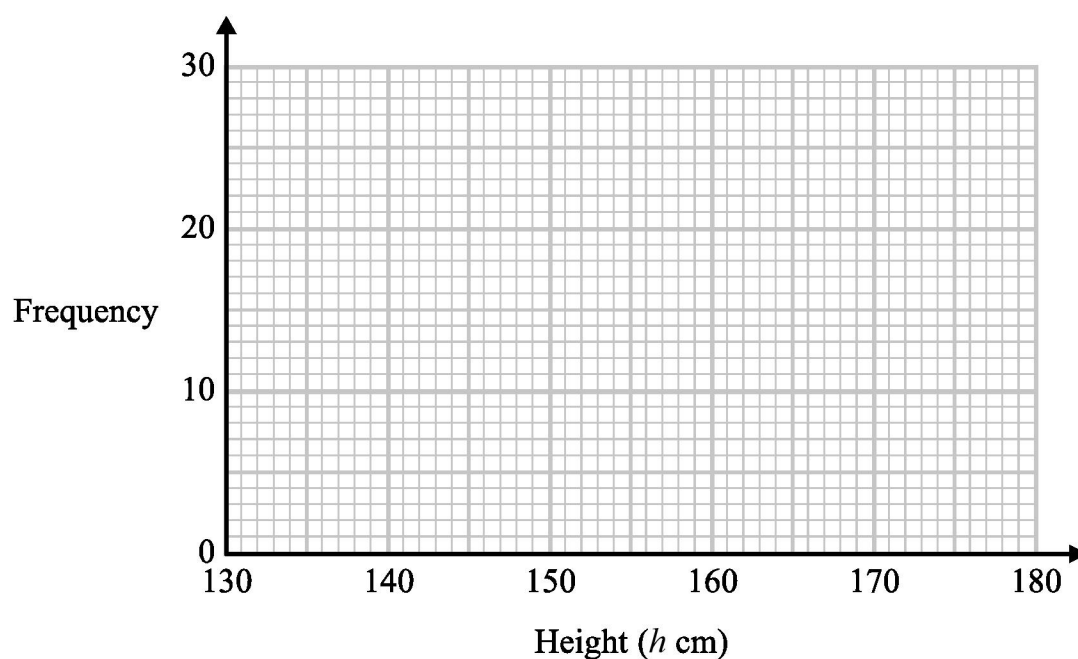
Calculate the volume of the cuboid.
Give your answer correct to 3 significant figures.

Question 21 (AO1): 33% of students got this right

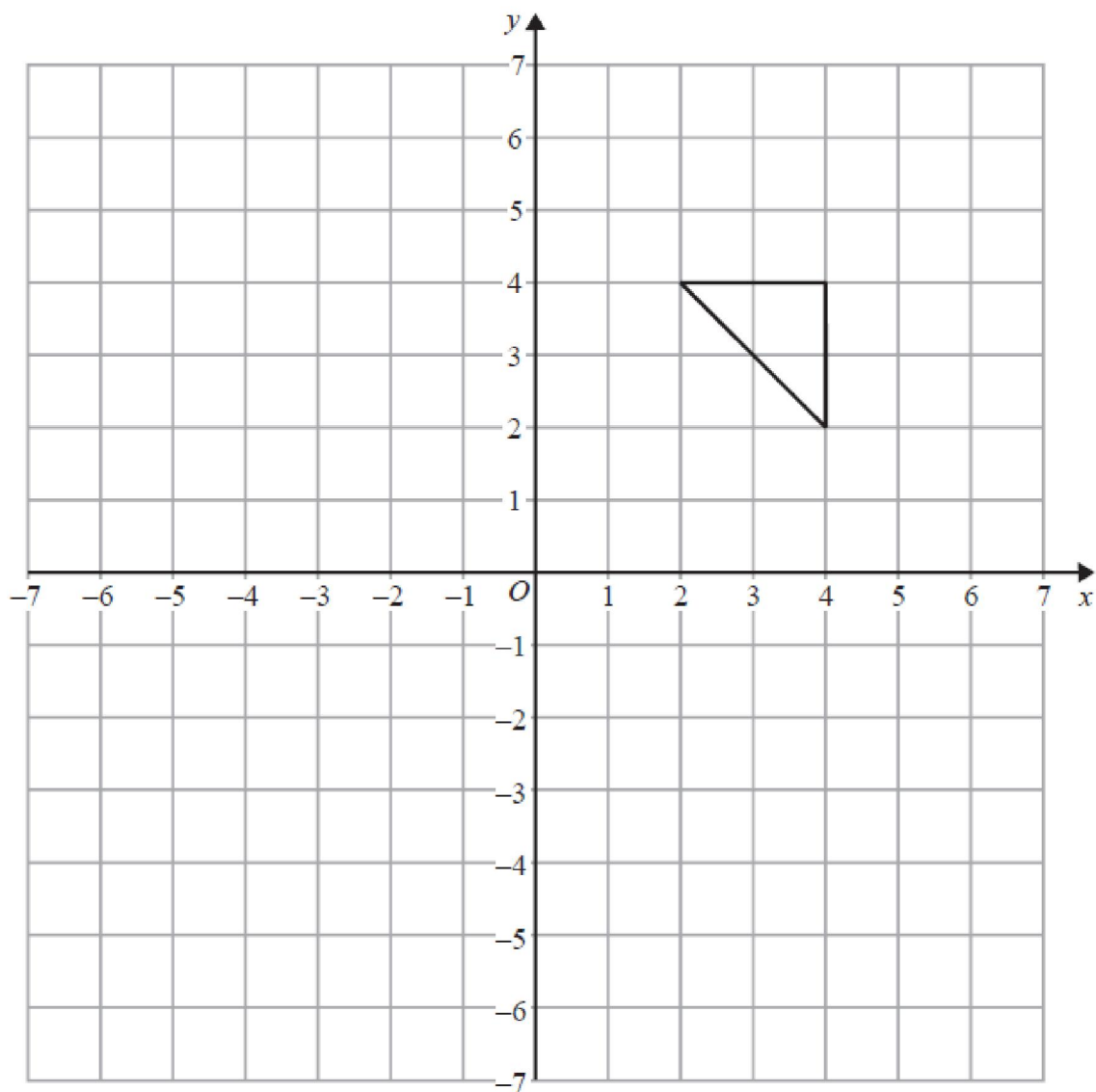19   The table shows information about the heights of 80 children.

Height (h cm)	Frequency
$130 < h \leqslant 140$	4
$140 < h \leqslant 150$	11
$150 < h \leqslant 160$	24
$160 < h \leqslant 170$	22
$170 < h \leqslant 180$	19

(b) Draw a frequency polygon for the information in the table.

Question 22 (AO1): 32% of students got this right

13

On the grid, enlarge the triangle by scale factor $-1\frac{1}{2}$, centre (0, 2).

Question 23 (AO2): 32% of students got this right

18 $(x - 8)(x + 4) = (x - a)^2 + b$ for all values of x.

Find the value of a and the value of b.

Question 24 (AO1): 31% of students got this right

14   (*b*) Make *v* the subject of the formula $W = \dfrac{15(t-2v)}{v}$

<div align="right">

(3)

(Total for Question 14 is 6 marks)

</div>

_____

Question 25 (AO1): 30% of students got this right

20 $m = \dfrac{1}{ps}$

$p = 5.37$ correct to 2 decimal places.
$s = 2.9$ correct to 1 decimal place.

Calculate the upper bound for the value for m.
You must show your working.

Answers to Qn 1 (AO1): 47% of students got this right

11	(d)		$b = \dfrac{a+9}{3}$	2	M1 for ÷ 3 throughout or adding 9 to both sides as a first step A1 $b = \frac{a+9}{3}$ oe

Answers to Qn 2 (AO2): 46% of students got this right

Question		Working	Answer	Mark	Notes
11		<u>US</u>	Correct conclusion based on correct calculations	5	M1 for a conversion, gallons to litres or litres to gallons
		1 gal costs 20.88÷6=$3.48			M1 for a conversion, roubles to US Dollars or US Dollars to roubles or convert both to Euros
		1 litre costs $3.48÷3.79 = $0.918...			
		I litre costs 0.918..× 0.77 Euros = 0.707..Euros			M1 for a conversion to common units and common currency
		<u>Russia</u>			A1 for two correct answers in the same currency and for the same unit
		1 litre costs 800 ÷25.58 = 31.27... Roubles			C1 (dep on at least M1) for correct conclusion ft candidate's figures.
		1 litre costs 31.27÷40.63 Euros = 0.769... Euros			
		Or			eg
		25.58 litres = 25.58 ÷ 3.79 = 6.749.. US gallons			M1 1 US gal costs 20.88÷6 (=3.48)
		800 roubles = (800÷40.63)÷0.77 = $25.571..			M1 1 litre costs 3.48 ÷3.79 ..× 0.77 (=0.707..)
		Cost in $ of 1 US gallon in Russia is 25.571..÷6.749... = $3.788..			M1 1 litre in Russia costs 800 ÷25.58 ÷40.63 (=0.769)
		Cost in $ of 1 US gallon in US = 20.88÷6 = $3.48			A1 for 0.707 and 0.769
					C1 (dep on at least M1) for correct conclusion ft candidate's figures.
		<u>Cost per litre for US petrol</u>			
		$0.918 or €0.707 or 28.7 rub			
		<u>Cost per gallon for US petrol</u>			
		$3.48 or €2.68 or 109 rub			
		<u>Cost per litre for Russian petrol</u>			
		31.27 rub or €0.770 or $1			
		<u>Cost per gallon for Russian petrol</u>			
		118 rub or €2.92 or $3.79			

Answers to Qn 3 (AO3): 45% of students got this right

Question	Working	Answer	Mark	Notes
7		17.7(014…)	3	B1 for 7.75 or 7.85 or 5.15 or 5.25 or 62.5 or 63.5 M1 for $\frac{1}{2} \times 7.75 \times 5.15 \times \sin 62.5$ A1 for 17.7(0140994…)

Answers to Qn 4 (AO2): 45% of students got this right

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

Diagram **NOT**
accurately drawn

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

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

Are there enough tables in the conference room?

$$\text{circumference} = \pi \times d$$
$$= \pi \times 140$$
$$= 439.8\, cm \ \ 1dp$$

$$\frac{439.8}{60} = 7.3\ldots \qquad 7 \text{ people fit around each table}$$

$$12 \times 7 = 84$$

84 people fit around the 12 tables.
There are not enough tables

Answers to Qn 5 (AO1): 45% of students got this right

Question	Working	Answer	Mark	Notes
15. (a)		$\dfrac{4}{5}$ oe	1	B1

Answers to Qn 6 (AO1): 44% of students got this right

7.	(*a*) (i)		{p,r,a}	1	B1 Withhold marks for repeats
	(ii)		{p,a,r,i,s,b,u,d,e,t}	1	B1 Withhold marks for repeats

Answers to Qn 7 (AO3): 43% of students got this right

3	(a)		4	P1	for process to find area of at least 2 different faces, e.g. 95×18 and 80×18
				P1	for a complete process to find the surface area of one cushion, e.g. (95 × 18 + 80 × 18 + 95 × 80) ×2
				P1	for process to convert units, e.g. 80 ÷ 100 (=0.8)
				P1	(dep on P2) for their area multiplied by 6 and divided by 4
				A1	cao
	(b)		Reduces (supported)	B1	for showing 4.4 is now covered or 2.93 tins or 3 tins
				C1	(dep) Statement that the number required of tins will be reduced

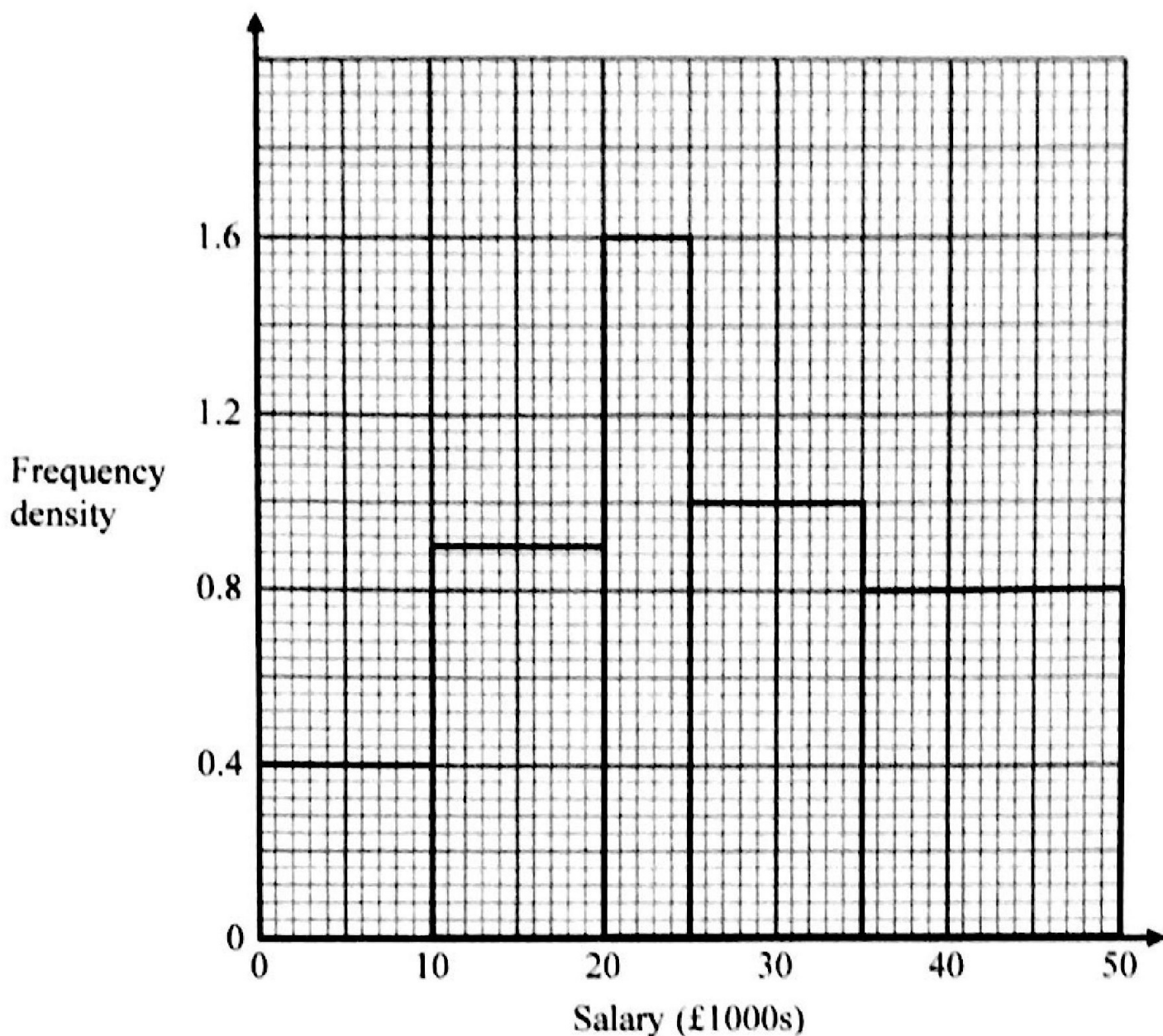# Answers to Qn 8 (AO2): 42% of students got this right

Paper 1MA1: 3H			
Question	**Working**	**Answer**	**Notes**
9 (a)		No with reason	C1 partial explanation, eg 0.96 × 0.975
			C1 No with full explanation, eg 0.96 × 0.975 = 0.936 so only a 6.4% reduction
(b)		3.15	P1 complete process to find value after 2 years eg (145000 – '5800') × 2.5/100 oe or 145000 × 0.96 × 0.975 (= 135720)
			P1 (140 000 – '135720') ÷ '135720' × 100 oe
			A1 for 3.15 – 3.154

Answers to Qn 9 (AO1): 42% of students got this right

15.	(b)		$r = \dfrac{am-1}{5-a}$	3	M1 for $5r - ar = am - 1$ oe (terms in r isolated)
					M1 for $r(5-a) = am - 1$
					A1

Answers to Qn 10 (AO1): 41% of students got this right

26 The histogram shows some information about the salaries of a sample of people.

Salary (£1000s)

(a) Use the histogram to complete the frequency table.

Salary (p) in £1000s	Frequency
$0 < p \leqslant 10$	4
$10 < p \leqslant 20$	9
$20 < p \leqslant 25$	8
$25 < p \leqslant 35$	

Grade5to7 and SAMPLE PACK

Answers to Qn 11 (AO1): 40% of students got this right

12		288	M1	for 24×12
			A1	cao

Answers to Qn 12 (AO3): 40% of students got this right

*13 Axel and Lethna are driving along a motorway.

They see a road sign.
The road sign shows the distance to Junction 8
It also shows the average time drivers will take to get to Junction 8

> **To Junction 8**
>
> 30 miles
> 26 minutes

The speed limit on the motorway is 70 mph.

Lethna says,

'We will have to drive faster than the speed limit to go 30 miles in 26 minutes.'

Is Lethna right?
You must show how you got your answer.

Speed to Junction 8

$$S = \frac{D}{T} \qquad S = \frac{30 \text{ miles}}{26 \text{ minute}} \quad \text{(not hours)}$$

Change 26 minutes to hours

$$\frac{26}{60} = 0.4\dot{3}$$

$$S = \frac{30}{0.4\dot{3}} = 69.230769 \text{ mph}$$

Lethna is wrong, 69.2 mph < 70 mph

Answers to Qn 13 (AO2): 39% of students got this right

| 10. | | $\frac{3}{5}\times\frac{1}{5}+\frac{1}{5}\times\frac{2}{5}+\frac{1}{5}\times\frac{2}{5}=\frac{7}{25}$ oe $\frac{7}{25}\times £1 = 28p$ 40p > 28p **OR** e.g. 200 games 200 × 40p = £80 "$\frac{7}{25}$" × 200 × £1 = £56 £80 > £56 | Yes, with justification | 5 | M1 or $\frac{3}{5}\times\frac{1}{5}$ or $\frac{1}{5}\times\frac{2}{5}$ or $\frac{1}{5}\times\frac{2}{5}$ M1(dep) for $\frac{3}{5}\times\frac{1}{5}+\frac{1}{5}\times\frac{2}{5}+\frac{1}{5}\times\frac{2}{5}$ A1 for $\frac{7}{25}$ oe M1 for "$\frac{7}{25}$" × £1 OR "$\frac{7}{25}$" × n × £1 **and** n × 40p C1 f.t. (dep on M3) for correct conclusion with fully correct justification based on expected profit per game or expected profit for a particular number of games |

Answers to Qn 14 (AO1): 38% of students got this right

14 The table gives information about the temperature, $T\,°C$, at noon in a town for 50 days.

Temperature ($T\,°C$)	Frequency	mp	F
$8 < T \leqslant 12$	6	10	60
$12 < T \leqslant 16$	8	14	112
$16 < T \leqslant 20$	13	18	234
$20 < T \leqslant 24$	21	22	462
$24 < T \leqslant 28$	2	26	52

$$\Sigma F = 50$$

920

(a) Write down the modal class interval.

$$20 < T \leq 24$$

(1)

(b) Calculate an estimate for the mean temperature.

$$\frac{\Sigma F \times mp}{\Sigma F} = \frac{920}{50}$$

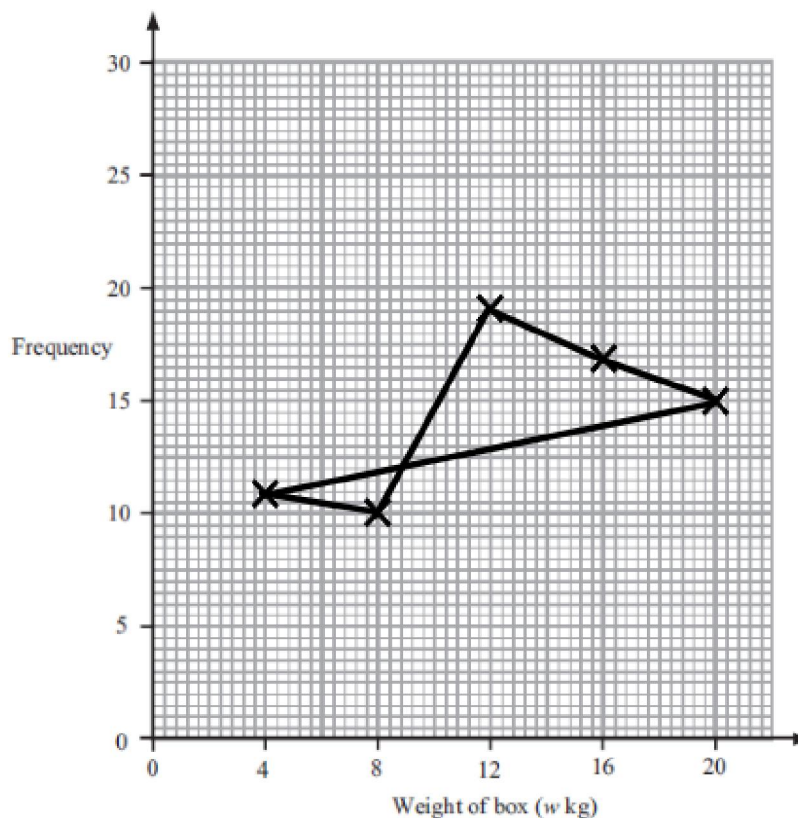$$= 18.4\,°C$$

Answers to Qn 15 (AO2): 38% of students got this right

4   The table shows information about the weights of boxes.

Weight of box (w kg)	Frequency
$0 < w \le 4$	11
$4 < w \le 8$	10
$8 < w \le 12$	19
$12 < w \le 16$	17
$16 < w \le 20$	15

Bronagh drew this frequency polygon for the information in the table.
The frequency polygon is **not** correct.

Write down **two** things that are wrong with the frequency polygon.

1 has used endpoint instead of midpoint

2 has joined the first point to the endpoint

(Total for Question 4 is 2 marks)

Answers to Qn 16 (AO3): 36% of students got this right

Question	Working	Answer	Mark	Notes
12		56	P1	for correct substitution into the formula for the volume of a cylinder, e.g. $\pi \times 5^2 \times h$ (= 1178)
			P1	for correct rearrangement to find the height e.g. $h = 1178 \div (\pi \times 5^2)$ (= 14.99876184)
			P1	(dep on P1) for correct use of tangent ratio, e.g. $\tan x =$ "14.99…" $\div 10$
			A1	for answer in the range 56 to 56.31

Answers to Qn 17 (AO1): 36% of students got this right

Question	Working	Answer	Mark	Notes
15	fd: 20 ÷ 28 = 0.8; 35 ÷ 20 = 1.75, 45 ÷ 15 = 3; 87 ÷ 15 = 5.8, 10 ÷ 10 = 1; 8 ÷ 10 = 0.8	histogram	C1	for 2 correct bars of different widths or at least 3 correct frequency densities
			C1	for all bars in correct proportions or 4 correct bars with axes scaled
			C1	for fully correct histogram with axes scaled

Answers to Qn 18 (AO3): 35% of students got this right

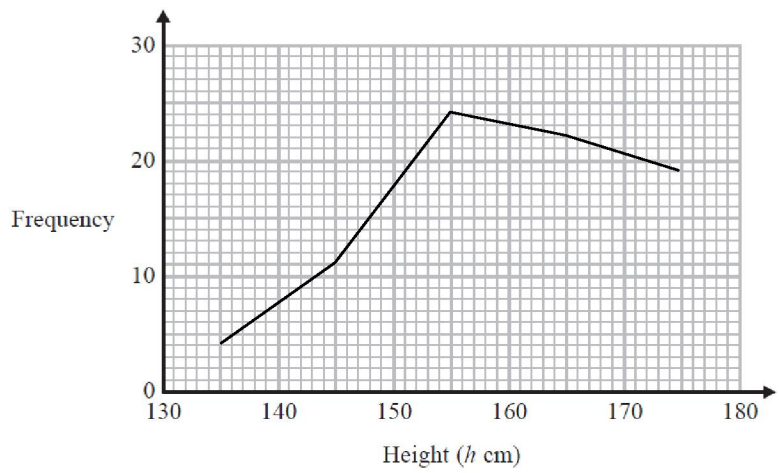| Paper 1MA1: 2H			
Question	Working	Answer	Notes
17	$\sqrt{8.35^2 - 6.05^2}$	5.754997828	B1 for finding bounds of one measurement,8.25 8.35, 6.05 or 6.15 P1 for process of choosing and using correct bounds P1 for process of Pythagoras' rule with correct bounds A1 for 5.754(997…)

Answers to Qn 19 (AO1): 34% of students got this right

Paper: 1MA1/2H				
Question	Working	Answer	Mark	Notes
15 (b)		66	M1	for starting a method to find number of games played, eg 12×11 (= 132) or sum of integers from 1 to 11
			A1	Cao

Answers to Qn 20 (AO3): 34% of students got this right

Paper 1MA1: 3H			
Question	Working	Answer	Notes
12		431	B1 for use of Pythagoras involving the unknown length P1 for setting up an equation equivalent to $x^2 = 15^2 - 5^2 - 7^2$ P1 for finding the volume using their "$\sqrt{15^2 - 5^2 - 7^2}$ A1awrt 430.5

Answers to Qn 21 (AO1): 33% of students got this right

Part	Working an or answer examiner might expect to see	Mark	Notes
19 (b)		2	These marks are given for a fully correct frequency polygon with line segments joining the points (135, 4), (145, 11), (155, 24), (165, 22) and (175, 19) (1 mark is given if any points are incorrect)

Answers to Qn 22 (AO1): 32% of students got this right

Paper 1MA1: 3H			
Question	**Working**	**Answer**	**Notes**
13		Triangle (–6, 2), (–6, –1), (–3, –1)	M1 for correct shape and the correct orientation in the wrong position or two vertices correct. A1 cao

Answers to Qn 23 (AO2): 32% of students got this right

Question	Working	Answer	Mark	Notes
18		2, −36	P1	for process to expand $(x − 8)(x + 4)$ or $(x − a)^2$
			P1	for process to find value of a (may be implied by $a = 2$)
			A1	cao

Answers to Qn 24 (AO1): 31% of students got this right

Question 14 (Total 6 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(b)	$15(t - 2v) = 15t - 30v$	M1	This mark is given for a correct step towards solution
	$wv = 15t - 30v$ $wv + 30v = 15t$ $v(w + 30) = 15t$	M1	This mark is given for a method to rearrange the formula to isolate terms in v
	$v = \dfrac{15t}{w+30}$	A1	This mark is given for the correct answer only

Answers to Qn 25 (AO1): 30% of students got this right

Question	Working	Answer	Mark	Notes
20		0.0654011543	B1	for stating bound for p, 5.365 or 5.375 or bound for s, 2.85 or 2.95
			M1	for use of two lower bounds in equation
			A1	for 0.0654…