PINPOINT LEARNING

PAPER THREE REVISION PACKS

63_to_100_Percent_Pinpoint_AI_Pack

Time Allocation = 87mins , Max = 77 Marks

Calculated Grade Boundaries:

Grade	Marks
6	7
6+	14
7-	21
7	28
7+	35
8-	42
8	49
8+	56
9-	63
9	70
9+	77

Question 1 (AO1): 36% of students got this right (3 marks)

7   Liquid **A** has a density of 1.42 g/cm^3

7 cm^3 of liquid **A** is mixed with 125 cm^3 of liquid **B** to make liquid **C**.

Liquid **C** has a density of 1.05 g/cm^3

Find the density of liquid **B**.
Give your answer correct to 2 decimal places.

Question 2 (AO1): 34% of students got this right (3 marks)

16   There is a large number of cubes in a bag.

Jason wants to work out an estimate for the number of cubes in the bag.

He takes at random 10 cubes from the bag.

He puts a mark on each cube and then puts each cube back in the bag.

Jason shakes the bag and then takes at random 20 of the cubes.

There is a mark on 3 of the cubes.

Work out an estimate for the total number of cubes in the bag.

Question 3 (AO3): 34% of students got this right (1 marks)

21. (*a*) Factorise $4x^2 - 9$

....
(1)

Question 4 (AO3): 34% of students got this right (4 marks)

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

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

Work out the density of liquid C.

Question 5 (AO3): 33% of students got this right (4 marks)
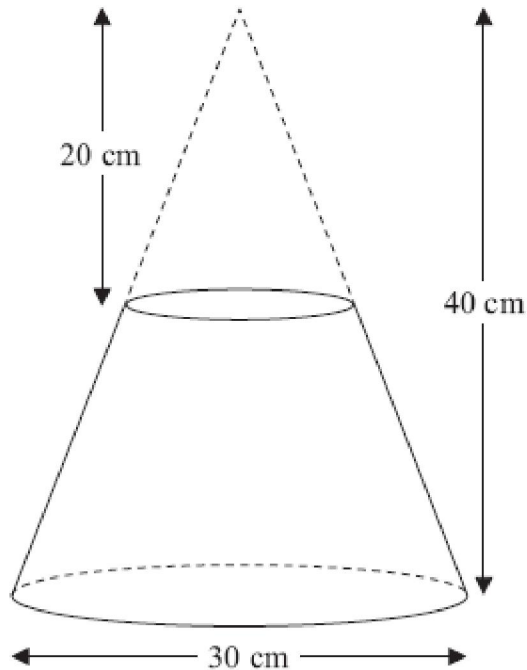
22.

Diagram **NOT** accurately drawn

A frustum is made by removing a small cone from a similar large cone.

The height of the small cone is 20 cm.
The height of the large cone is 40 cm.
The diameter of the base of the large cone is 30 cm.

Work out the volume of the frustum.
Give your answer correct to 3 significant figures.

(Total for Question 22 is 4 marks)

Question 6 (AO1): 32% of students got this right (3 marks)

17   Here are the first 5 terms of a quadratic sequence.

<div align="center">

1   3   7   13   21

</div>

Find an expression, in terms of n, for the nth term of this quadratic sequence.

Question 7 (AO1): 31% of students got this right (3 marks)

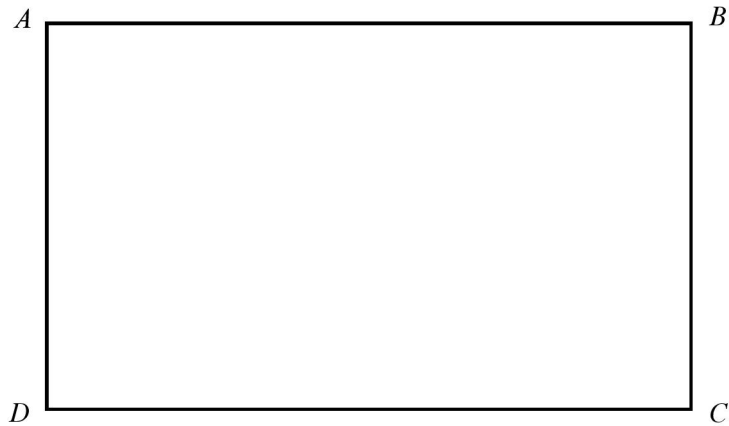13   The number of slugs in a garden t days from now is p_t where

$p_0 = 100$

$p_{t+1} = 1.06p_t$

Work out the number of slugs in the garden 3 days from now.

Question 8 (AO1): 31% of students got this right (4 marks)

3   Here is an accurate scale drawing of a school playground.

1 cm represents 2 m

Asif is going to put a seat in the playground.

The seat has to be

       less than 9 m from C
       closer to BC than to AB
       more than 4 m from AB

Show, by shading on the diagram, the region where Asif can put the seat.

Question 9 (AO3): 30% of students got this right (3 marks)

9   Yesterday it took 5 cleaners $4\frac{1}{2}$ hours to clean all the rooms in a hotel.

There are only 3 cleaners to clean all the rooms in the hotel today.

Each cleaner is paid £8.20 for each hour or part of an hour they work.

How much will each cleaner be paid today?

Question 10 (AO3): 30% of students got this right (3 marks)

13   At the beginning of 2009, Mr Veale bought a company.
      The value of the company was £50 000.

      Each year the value of the company increased by 2%.

      At the beginning of 2009 the value of a different company was £250 000.
      In 6 years the value of this company increased to £325 000.

      This is equivalent to an increase of $x\%$ each year.

      (*b*) Find the value of x.
             Give your answer correct to 2 significant figures.

Question 11 (AO3): 27% of students got this right (4 marks)

21.   The histogram shows some information about the weights of a sample of apples.
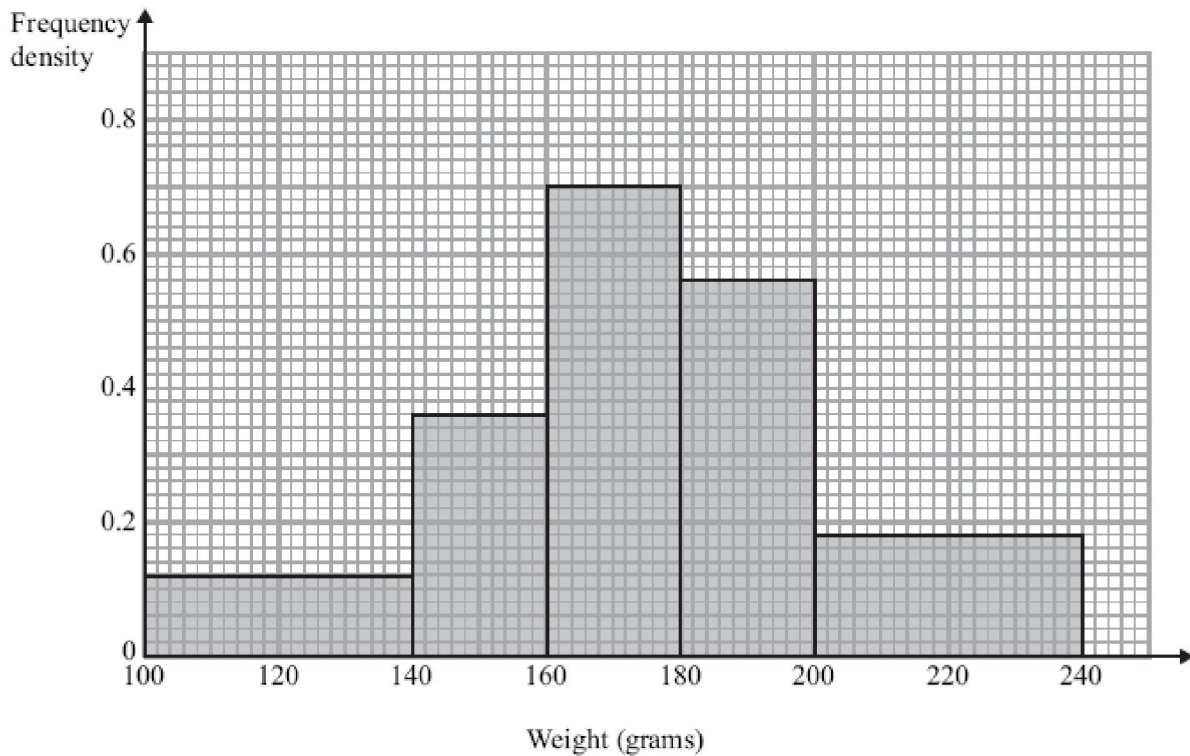
Work out the proportion of apples in the sample with a weight between 140 grams and 200 grams.

....

(Total for Question 21 is 4 marks)

Question 12 (AO1): 25% of students got this right (3 marks)

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

    A washing machine has a sale price of £464

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

    £...

(Total for Question 20 is 3 marks)

Question 13 (AO2): 24% of students got this right (2 marks)

13.   Steve and Carol are participating in a car race.

Steve drives from checkpoint A to checkpoint B, on a bearing of 50°.
Carol will drive from checkpoint A to checkpoint B.

Determine the bearing of *A* from *B*.

....°

(Total 2 marks)

_____

Question 14 (AO1): 24% of students got this right (4 marks)

18. The table gives some information about the lengths of time, in hours, that some adults watched TV last week.

Length of time (t hours)	Frequency
$0 < t \leq 10$	8
$10 < t \leq 15$	15
$15 < t \leq 20$	11
$20 < t \leq 30$	10
$30 < t \leq 50$	6

(a) Work out an estimate for the mean length of time.

....hours

(4)

Question 15 (AO3): 24% of students got this right (5 marks)

*24. $m = \dfrac{\sqrt{s}}{t}$

$s = 3.47$ correct to 2 decimal places.
$t = 8.132$ correct to 3 decimal places.

By considering bounds, work out the value of m to a suitable degree of accuracy.

You must show all your working and give a reason for your final answer.

(Total for Question 24 is 5 marks)

Question 16 (AO3): 22% of students got this right (3 marks)

9   A savings account pays interest at a rate of $R\%$ per year.
Jack invests £5500 in the account for one year.

At the end of the year, Jack pays tax on the interest at a rate of 40%.
After paying tax, he gets £79.20.

(b) Work out the value of R.

Question 18 (AO3): 18% of students got this right (4 marks)

16. Liquid A has a density of 1.3 g/cm^3.
Liquid B has a density of 1.7 g/cm^3.

Liquid C contains 117 g of liquid A and 170 g of liquid B.

Determine the density of liquid C.

.... g/cm^3

(Total 4 marks)

_____

Question 19 (AO2): 17% of students got this right (1 marks)

18 At time $t = 0$ hours a tank is full of water.

Water leaks from the tank.
At the end of every hour there is 2% less water in the tank than at the start of the hour.

The volume of water, in litres, in the tank at time t hours is V_t

Given that

$$V_0 = 2000$$
$$V_{t+1} = kV_t$$

write down the value of k.

Question 20 (AO3): 15% of students got this right (5 marks)
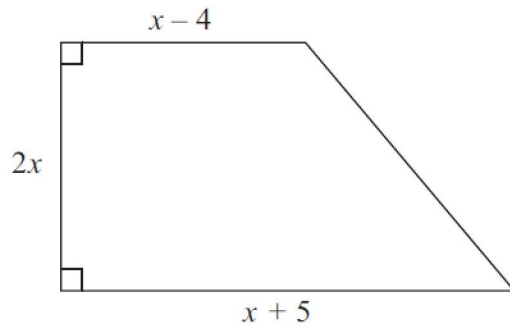
22.   The diagram shows a trapezium.

Diagram **NOT** accurately drawn

All the measurements are in centimetres.

The area of the trapezium is 351 cm^2.
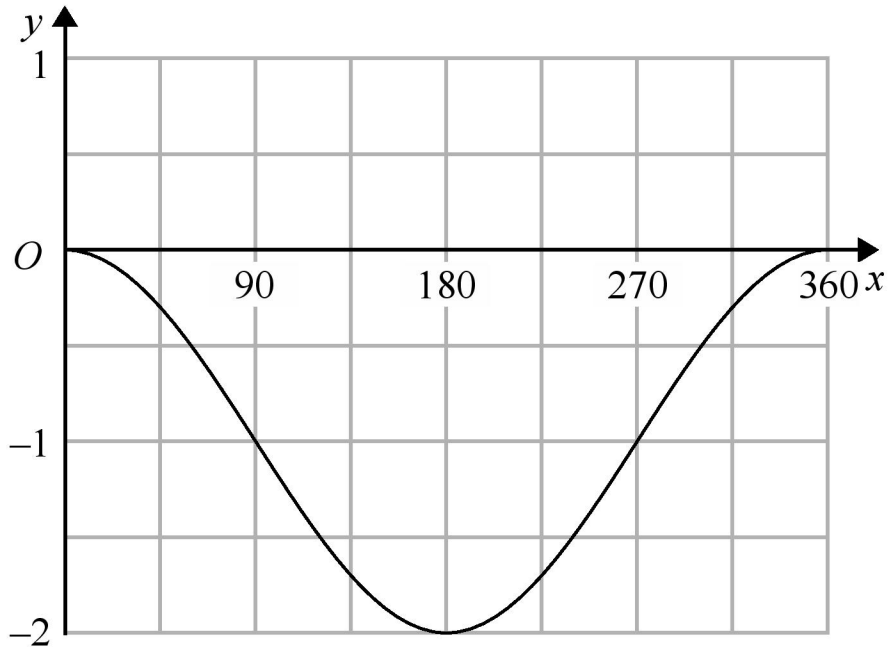
(a) Show that $2x^2 + x - 351 = 0$

(2)

(b) Work out the value of x.

....

(3)

Question 21 (AO2): 13% of students got this right (2 marks)

18 Here is a sketch of the curve $y = \sin(x + a)° + b$

Given that $0 < a < 360$, find the value of a and the value of b.

Question 23 (AO1): 8% of students got this right (4 marks)

19. The line **L** is a tangent to the circle $x^2 + y^2 = 45$ at the point $(-3, 6)$.

The line **L** crosses the x-axis at the point P.

Work out the coordinates of P.

Question 24 (AO3): 4% of students got this right (3 marks)

23   S is a geometric sequence.

    (*a*)   Given that $(\sqrt{x}\ -1)$, 1 and $(\sqrt{x}+1)$ are the first three terms of S, find the value of x.
         You must show all your working.

Answers to Qn 1 (AO1): 36% of students got this right

Question	Working	Answer	Mark	Notes
7		1.03	P1	for process to find the mass of either **A** or **C**, e.g. 7 × 1.42 (= 9.94) or (7 + 125) × 1.05 (= 138.6)
			P1	(dep) for a complete process to find the density of **B**, e.g. ("138.6" − "9.94") ÷ 125
			A1	for answer in the range 1.029 to 1.03

Answers to Qn 2 (AO1): 34% of students got this right

Question	Working	Answer	Mark	Notes
16		67	P1	for process to use proportions, e.g. $\dfrac{10}{n}$ or $\dfrac{3}{20}$
			P1	for process to form equation, e.g. $\dfrac{10}{n} = \dfrac{3}{20}$
			A1	cao

Answers to Qn 3 (AO3): 34% of students got this right

21 (a) Factorise $4x^2 - 9$

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

Difference of two squares $(2x+3)(2x-3)$

(1)

Answers to Qn 4 (AO3): 34% of students got this right

Question		Working	Answer	Mark	Notes
13		Volume of A = $\dfrac{140}{0.7}$ $= 200$ Volume of B = $\dfrac{128}{1.6} = 80$ Mass of C = 140 + 128 $= 268$ Density of C = $\dfrac{268}{280}$	0.957	4	M1 for finding the volume of either liquid A or B or the mass of liquid C M1 for a complete method to find the volume AND mass of liquid C M1 (dep M2) for "total mass" ÷ " total volume" A1 for 0.957 to 0.96

Answers to Qn 5 (AO3): 33% of students got this right
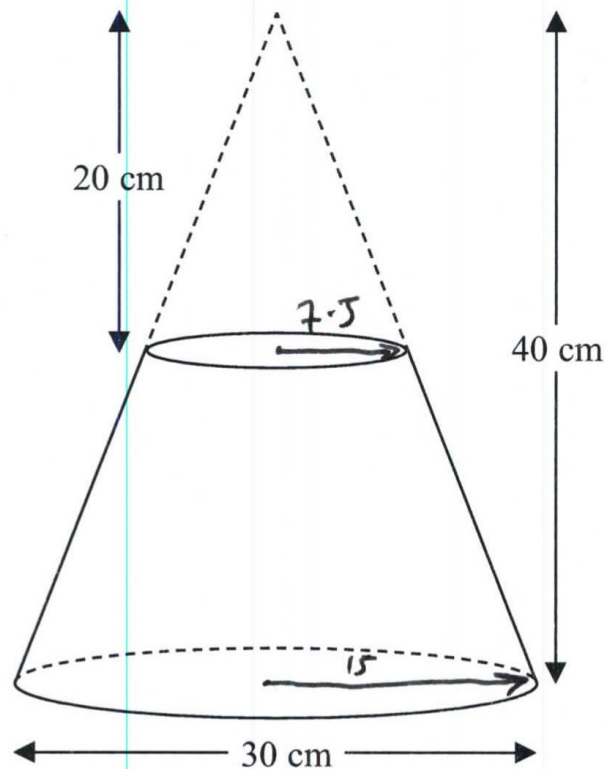
22

20 cm

7·5

40 cm

Diagram **NOT**
accurately drawn

15

30 cm

A frustrum is made by removing a small cone from a similar large cone.
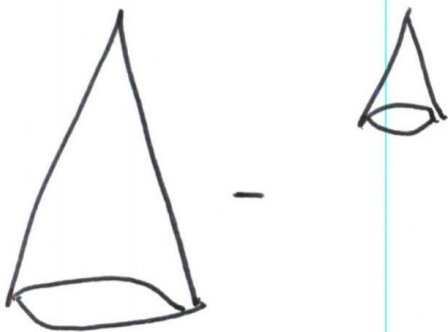
The height of the small cone is 20 cm.
The height of the large cone is 40 cm.
The diameter of the base of the large cone is 30 cm.

Work out the volume of the frustrum.
Give your answer correct to 3 significant figures.

$$= \frac{1}{3}\pi \times 15^2 \times 40 - \frac{1}{3} \times \pi \times 7.5^2 \times 20$$

Answers to Qn 6 (AO1): 32% of students got this right

Paper 1MA1: 2H			
Question	**Working**	**Answer**	**Notes**
17		$n^2 - n + 1$ oe	M1 for correct deduction from differences, eg. 2nd M1 difference of 2 implies $1n^2$ or sight of $1^2, 2^2, 3^2, ..$ A1 for sight of $1^2, 2^2, 3^2, ..$ linked with 1, 2, 3, ... for $n^2 - n + 1$ oe

Answers to Qn 7 (AO1): 31% of students got this right

Paper 1MA1: 2H			
Question	**Working**	**Answer**	**Notes**
13		119	M1 for 1.06×100 oe M1 for $1.06^3 \times 100$ oe A1 accept 119.1016

Answers to Qn 8 (AO1): 31% of students got this right

| Question	Working	Answer	Mark	Notes
3		Correct region	B1	for an arc of radius 4.5 cm centred on *C*
			B1	for a correct angle bisector drawn at angle *ABC*
			B1	for a line drawn 2 cm from *AB*
			C1	for the correct region shaded; accept any consistent shading

Answers to Qn 9 (AO3): 30% of students got this right

Paper: 1MA1/2H

Question	Working	Answer	Mark	Notes
9		65.60	P1	for start in using inverse proportionality, eg 5×4.5 $(= 22.5)$ or $4.5 = \dfrac{k}{5}$ or $5 \times 4.5 \times 60$ $(= 1350)$ or $\dfrac{5}{3}$ or $\dfrac{3}{5}$
			P1	for process to find number of hours for each cleaner today, eg $\dfrac{22.5}{3}$ $(= 7.5)$
			A1	for $65.6(0)$
				(SC B2 for $61.5(0)$)

Answers to Qn 10 (AO3): 30% of students got this right

Paper: 1MA1/2H

Question	Working	Answer	Mark	Notes
13 (b)		4.5	P1	for a process to find multiplier for 6 year period, eg $325 \div 250$ oe $(= 1.3)$ or $130(\%)$ or for $250000 \times y^6 = 325000$
			P1	for a process to find multiplier for one year, eg $("1.3")^{\frac{1}{6}}$ or $1.044\ldots$ or 1.045
			A1	$4.4 - 4.5$

Answers to Qn 11 (AO3): 27% of students got this right

21 The histogram shows some information about the weights of a sample of apples.
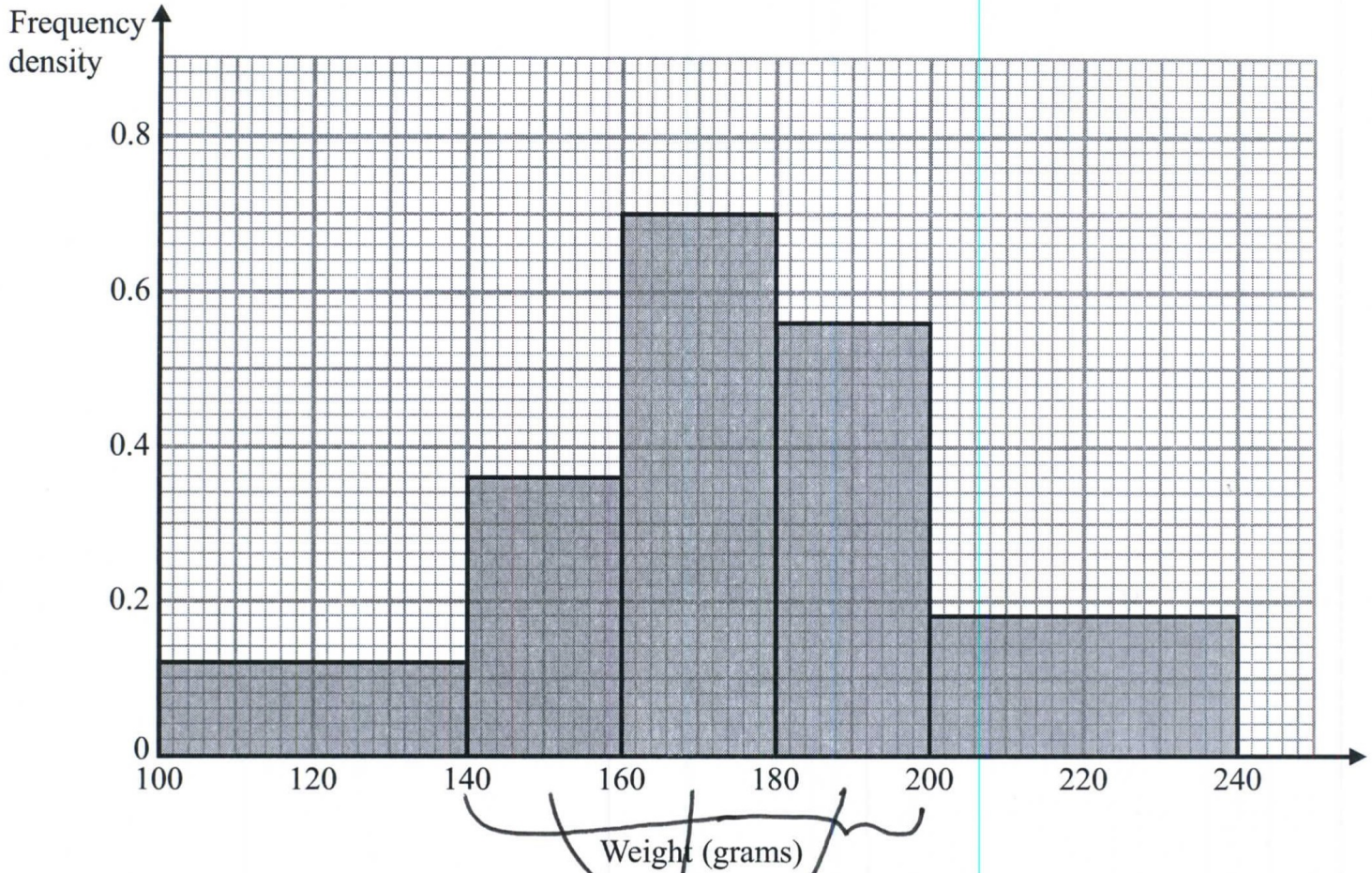
Work out the proportion of apples in the sample with a weight between 140 grams and 200 grams.

$$Fr = FD \times CW$$

$$\frac{20 \times 0.26 + 20 \times 0.7 + 20 \times 0.56}{40 \times 0.12 + 20 \times 0.26 + 20 \times 0.7 + 20 \times 0.56 + 40 \times 1.8}$$

$$= \frac{32.4}{44.4} = \underline{0.73}$$

or count the big squares

$$30 \times 25 + 30 \times 1 + 30 \times 1 = 810$$

$$\frac{810}{810 + 300} = 0.73$$

Answers to Qn 12 (AO1): 25% of students got this right

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

A washing machine has a <u>sale price</u> of £464

By <u>how much money is the normal price of the washing machine reduced?</u>

$\div 8 \Big($ $80\% = £464$
$10\% = £58$
$100\% = £580$

$£580$
$\underline{- 464}$
$ 116$

Reduced by £116

£ ~~580~~

(Total for Question 20 is 3 marks)

OR $\quad 0.8A = £464$
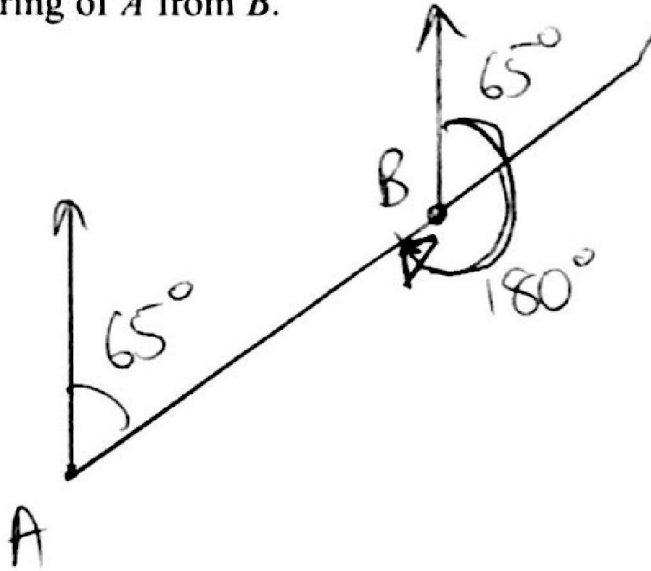
$A = \dfrac{464}{0.8} = 580$

Answers to Qn 13 (AO2): 24% of students got this right

13 Martin and Janet are in an orienteering race.

Martin runs from checkpoint A to checkpoint B, on a bearing of 065°
Janet is going to run from checkpoint B to checkpoint A.

Work out the bearing of A from B.

65°

B

180°

65°

A

245

Answers to Qn 14 (AO1): 24% of students got this right

18 The table gives some information about the lengths of time, in hours, that some adults watched TV last week.

Length of time (t hours)	Frequency	MP × f
$0 \leqslant t < 10$ **5×**	8	40
$10 \leqslant t < 15$ **12.5×**	15	187.5
$15 \leqslant t < 20$ **17.5×**	11	192.5
$20 \leqslant t < 30$ **25 ×**	10	250
$30 \leqslant t < 50$ **40×**	6	240
	50	**910**

(a) Work out an estimate for the mean length of time.

$$910 \div 50 = 18.2$$

........**18.2**........ hours

(4)

Answers to Qn 15 (AO3): 24% of students got this right

*24 $m = \dfrac{\sqrt{s}}{t}$

$s = 3.47$ correct to 2 decimal places
$t = 8.132$ correct to 3 decimal places

By considering bounds, work out the value of m to a suitable degree of accuracy.

You must show all your working and give a reason for your final answer.

$s \nearrow^{3.475}_{\searrow 3.465}$

$t \nearrow^{8.1325}_{\searrow 8.1315}$

Upper bound

$$m = \frac{\sqrt{3.475}}{8.1315} = 0.2292$$

Lower bound

$$m = \frac{\sqrt{3.465}}{8.1325} = 0.2288$$

Answ $= 0.229$ as this is what the LB and UB round to with 3dp.

Answers to Qn 16 (AO3): 22% of students got this right

Part	Working or answer an examiner might expect to see	Mark	Notes
9 (b)	$79.20 \div 0.6 = 132$	1	This mark is given for finding the amount of interest before tax is deducted
	$(132 \div 5500) \times 100$	1	This mark is given for a method to find R
	2.4	1	This mark is given for the correct answer only

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

16 Liquid A has a density of 0.7 g/cm³.
Liquid B has a density of 1.6 g/cm³.

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

Work out the density of liquid C.

$$\frac{140}{0.7} = 200 \qquad \frac{128}{1.6} = 80$$

Mass of C = ~~280~~ 268

Density of C = $\frac{268}{280}$ = 0.957

Answers to Qn 19 (AO2): 17% of students got this right

Paper: 1MA1/2H				
Question	Working	Answer	Mark	Notes
18		0.98	B1	cao

Answers to Qn 20 (AO3): 15% of students got this right

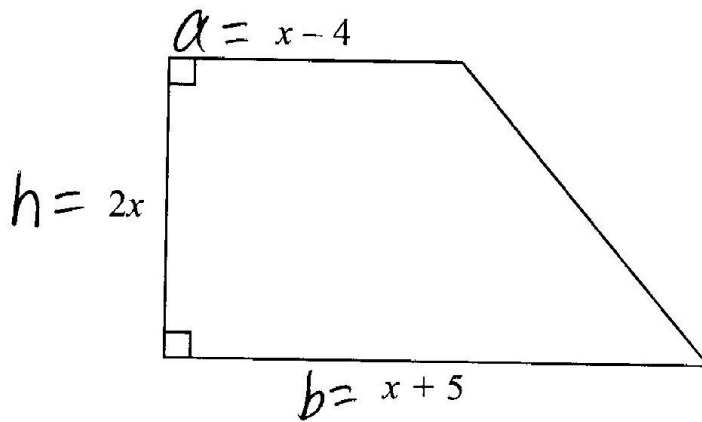**22** The diagram shows a trapezium.

$a = x - 4$

Diagram **NOT** accurately drawn

$h = 2x$

$b = x + 5$

All the measurements are in centimetres.

The area of the trapezium is 351 cm².

(a) Show that $2x^2 + x - 351 = 0$

$A = \frac{1}{2}(a+b)h$

$= \frac{1}{2}(x-4+x+5) \times 2x$

$= (2x+1) \times x$

$= 2x^2 + x$

$2x^2 + x = 351$

so

$2x^2 + x - 351 = 0$

(2)

(b) Work out the value of x.

$2x^2 + x - 351 = 0$

$2x^2 - 26x + 27x - 351 = 0$

$2x(x-13) + 27(x-13) = 0$

$(2x+27)(x-13) = 0$

$a \times c = -702$

Product -702

Sum $+1$

$\boxed{-26, 27}$

$x = 13 \qquad x = -\frac{27}{2} \quad \times \; \text{can't be negative}$

$(?) \quad x = 13$

(Total for Question 22 is 5 marks)

Answers to Qn 21 (AO2): 13% of students got this right

Question	Working	Answer	Mark	Notes
18		$a = 90$ $b = -1$	B1 B1	for $a = 90$ for $b = -1$

Answers to Qn 23 (AO1): 8% of students got this right

Question	Working	Answer	Mark	Notes
19		(–15, 0)	4	M1 method to find gradient of tangent, e.g. $-1 \div -\dfrac{6}{3}$ $(=\dfrac{1}{2})$ M1 for method to find equation of tangent with $m =$ " $\dfrac{1}{2}$ " M1 for method to find x-axis intercept of tangent A1 cao

Answers to Qn 24 (AO3): 4% of students got this right

Paper: 1MA1/2H

Question	Working	Answer	Mark	Notes
23 (a)		2	M1	for start to express the common ratio algebraically, eg $1/(\sqrt{x} - 1)$ or $(\sqrt{x} + 1)/1$ or $\sqrt{x} + 1 = k \times 1$ or $1 = k \times(\sqrt{x} - 1)$
			M1	for setting up an appropriate equation in x, eg $1/(\sqrt{x} - 1)= (\sqrt{x} + 1)/1$
			C1	for convincing argument to show $x = 2$