ADA PINPOINT PACKS

54_to_83_Percent_Pinpoint_AI_Pack

Made for Grade6to8_Paper3

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): 45% of students got this right

8 Make t the subject of $p = \sqrt{a + \frac{t}{2}}$

Question 2 (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 3 (AO1): 42% of students got this right

14 Prove algebraically that the recurring decimal $0.45\dot{7}$ can be written as $\frac{151}{330}$

Question 4 (AO2): 41% of students got this right

15 A virus on a computer is causing errors.
An antivirus program is run to remove these errors.

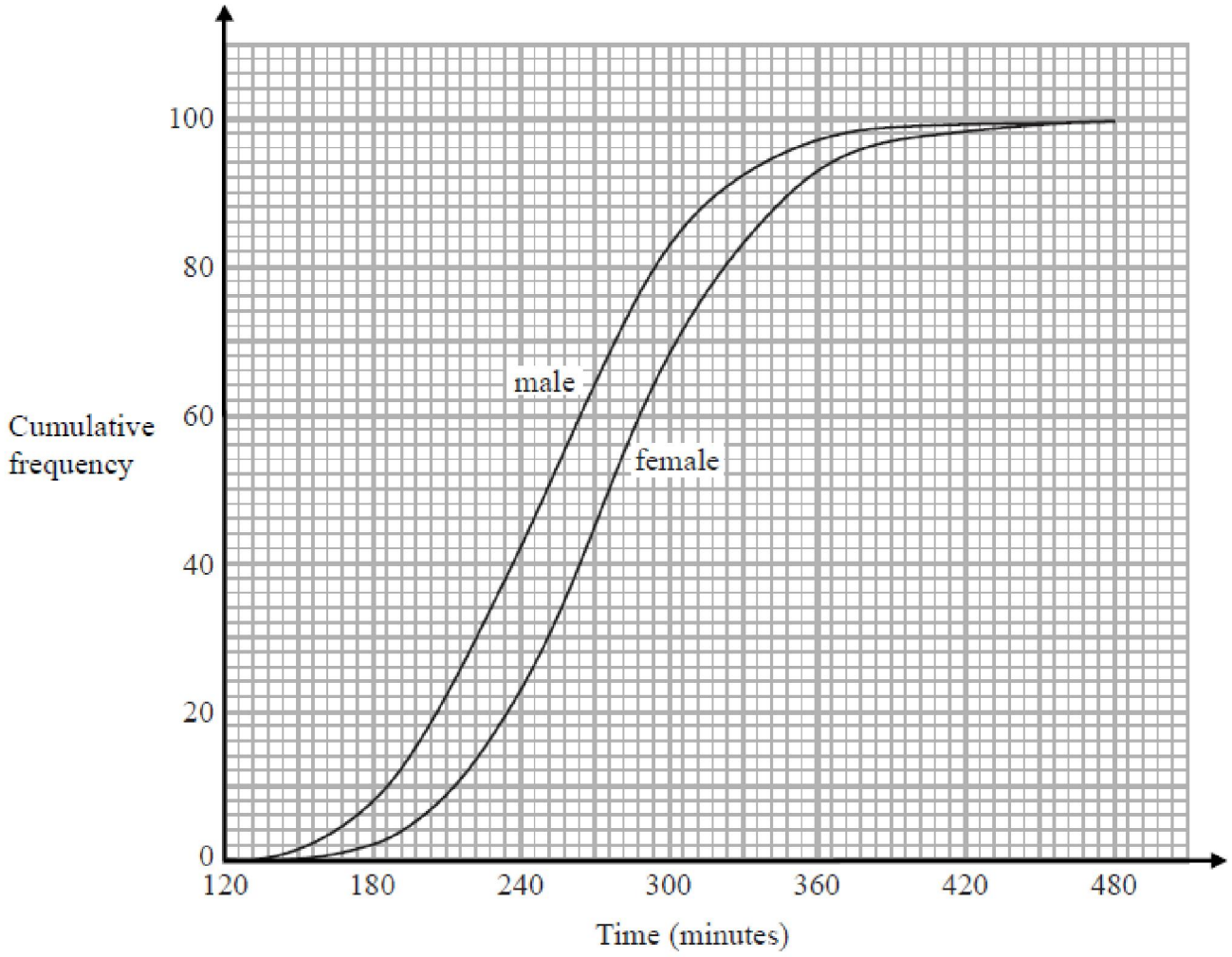
An estimate for the number of errors at the end of t hours is $10^6 \times 2^{-t}$

(a) Work out an estimate for the number of errors on the computer at the end of 8 hours.

(b) Explain whether the number of errors on this computer ever reaches zero.

Question 5 (AO2): 40% of students got this right

11 The cumulative frequency graphs show information about the times taken by 100 male runners and by 100 female runners to finish the London marathon.



A male runner is chosen at random.

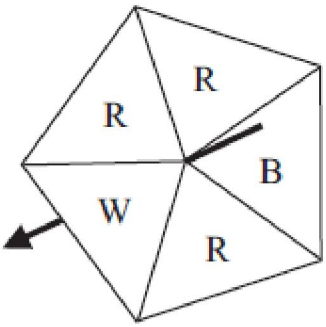
(*a*) Find an estimate for the probability that this runner took less than 4 hours to finish the London marathon.

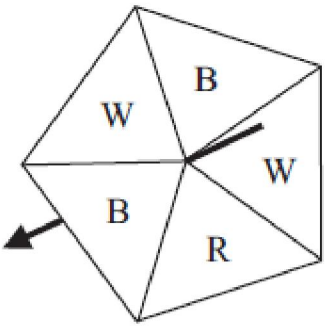
(*b*) Use medians and interquartile ranges to compare the distribution of the times taken by the male runners with the distribution of the times taken by the female runners.

Question 6 (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.

(Total 5 marks)

Question 7 (AO1): 37% of students got this right

12 a Here are the first four terms of a quadratic sequence.

4 9 16 25

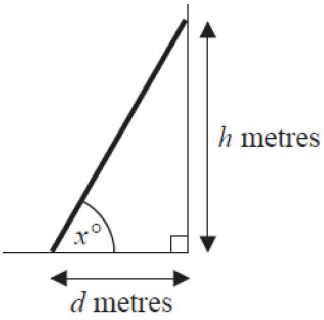
(a) Find an expression, in terms of n, for the nth term of this sequence.

.....

(3)

Question 8 (AO2): 36% of students got this right

11 b The foot of a ladder is on horizontal ground.
The top of the ladder is leaning against a vertical wall.



The foot of the ladder is d metres from the wall.
The top of the ladder is h metres above the ground.
The angle between the ladder and the ground is $x°$

Lula says it is safe to climb the ladder when

$$h = 3d$$

(a) Work out the value of x when $h = 3d$

Ebony says the angle between the ladder and the ground should be 70°
The ladder is moved so that $x = 70$

(b) How does this affect the height, h metres, of the top of the ladder above the ground?

.....

.....

.....

(1)

Question 9 (AO3): 35% of students got this right

10 In a sale, the price of a TV is reduced by 25%.

A week later, the sale price of the TV is reduced by 15%.
The price of the TV is now £293.25.

What was the price of the TV before the sale?

Question 10 (AO2): 34% of students got this right

12. The diagram shows a regular pentagon *ABCDE*.

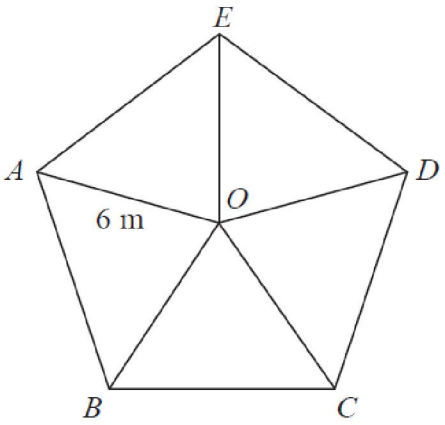


Diagram **NOT** accurately drawn

The pentagon is divided into 5 isosceles triangles.
$OA = OB = OC = OD = OE = 6$ m

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

..... m^2

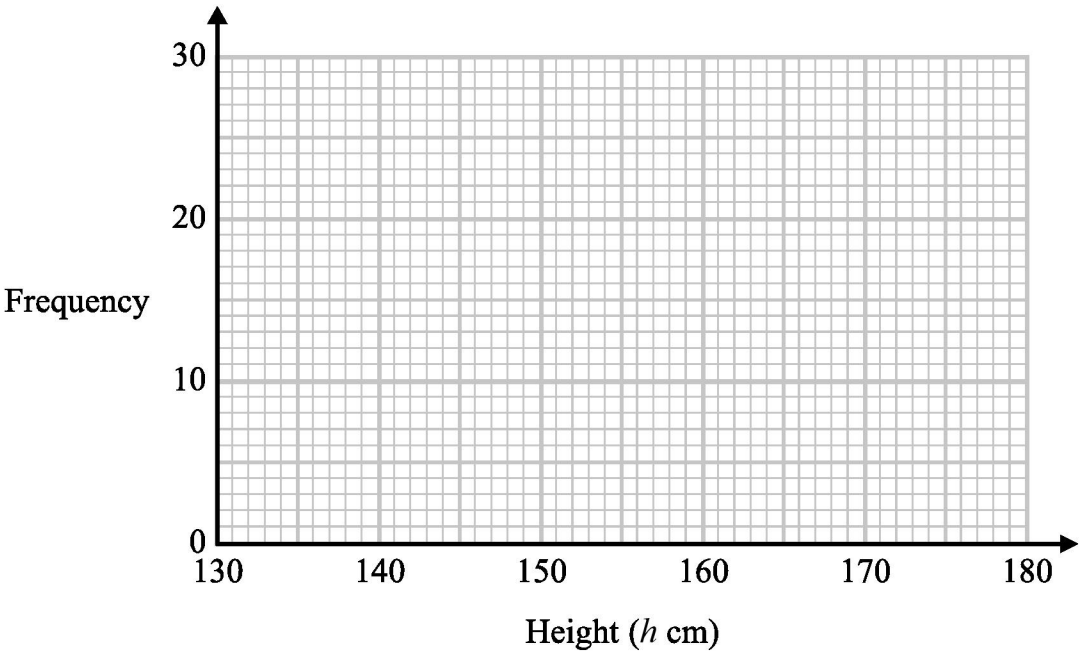
(Total 4 marks)

Question 11 (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 12 (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 13 (AO1): 31% of students got this right

15. Phil has 20 sweets in a bag.

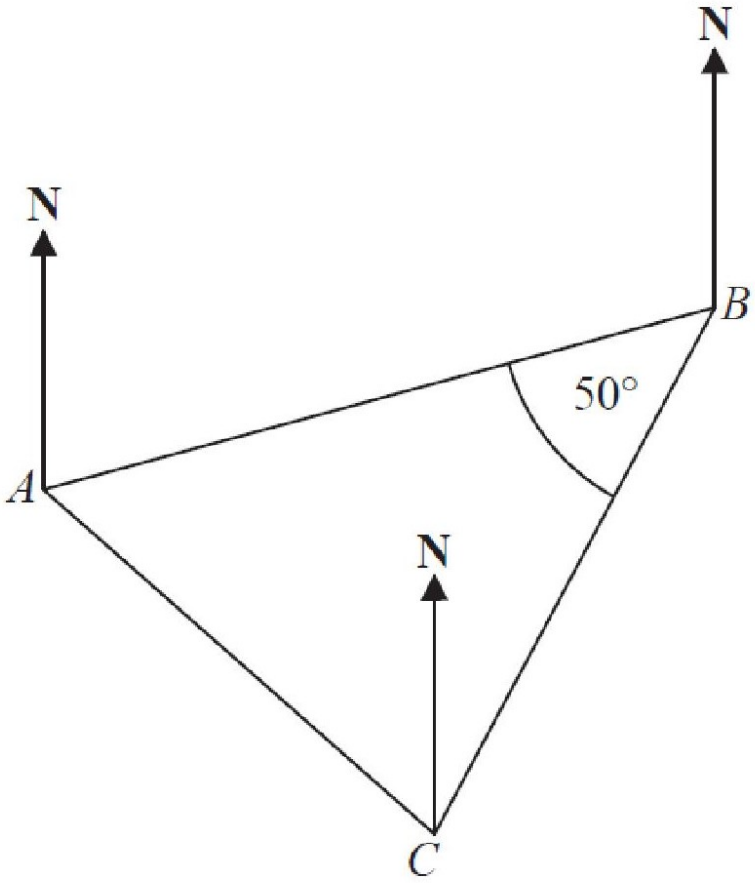
5 of the sweets are orange.
7 of the sweets are red.
8 of the sweets are yellow.

Phil takes at random **two** sweets from the bag.

Work out the probability that the sweets will **not** be the same colour.

Question 14 (AO3): 30% of students got this right

9 The diagram shows the positions of three points, A, B and C, on a map.



The bearing of B from A is 070°

Angle ABC is 50°
$AB = CB$

Work out the bearing of C from A.

Question 15 (AO1): 29% of students got this right

13b (b) Show that the equation $x^3 - 7x + 5 = 0$ can be arranged to give $x = \frac{5}{7 - x^2}$

(2)

Question 16 (AO3): 28% of students got this right

13 Harrison wants to find out how many squirrels there are in a park.

One day he puts a tag on each of 15 of the squirrels.
The next day he catches 30 squirrels.
6 of these squirrels have tags on them.

(i) Work out an estimate for the number of squirrels in the park.

.....

(2)

Harrison assumed that none of the tags fell off during the night.

(ii) If Harrison's assumption is wrong, explain how this could affect your answer to part (i).

.....

.....

.....

(1)

(Total for Question 13 is 4 marks)

Question 17 (AO3): 27% of students got this right

2. On a school trip the ratio of the number of teachers to the number of students is 1 : 15

The ratio of the number of male students to the number of female students is 7 : 5

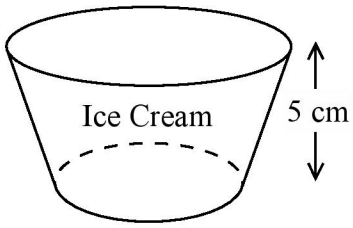
Work out what percentage of all the people on the trip are female students.
Give your answer correct to the nearest whole number.

.....%

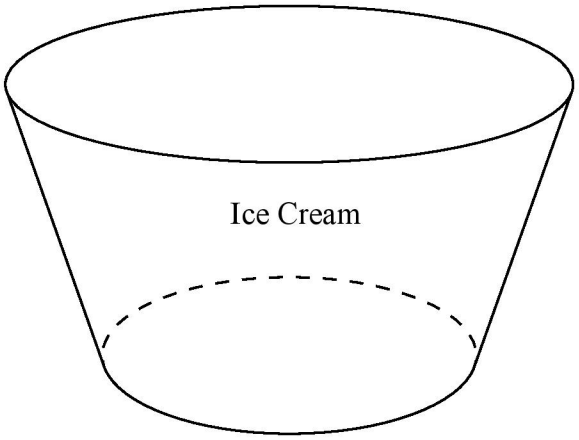
(Total for Question 2 is 3 marks)

Question 18 (AO1): 26% of students got this right

17 A factory makes ice cream tubs in two sizes, small and large.



small



large

The tubs are similar in shape.

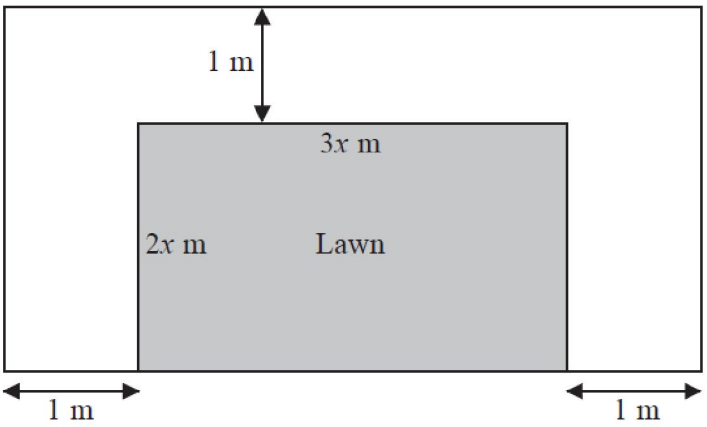
The height of the small tub is 5 cm.

The volume of the small tub is 150 cm^3.
The volume of the large tub is 500 cm^3.

Work out the height of the large tub.
Give your answer correct to 3 significant figures.

Question 19 (AO2): 26% of students got this right

9. A rectangular lawn has a length of $3x$ metres and a width of $2x$ metres.
The lawn has a path of width 1 metre on three of its sides.



The total area of the lawn and the path is 100 m^2

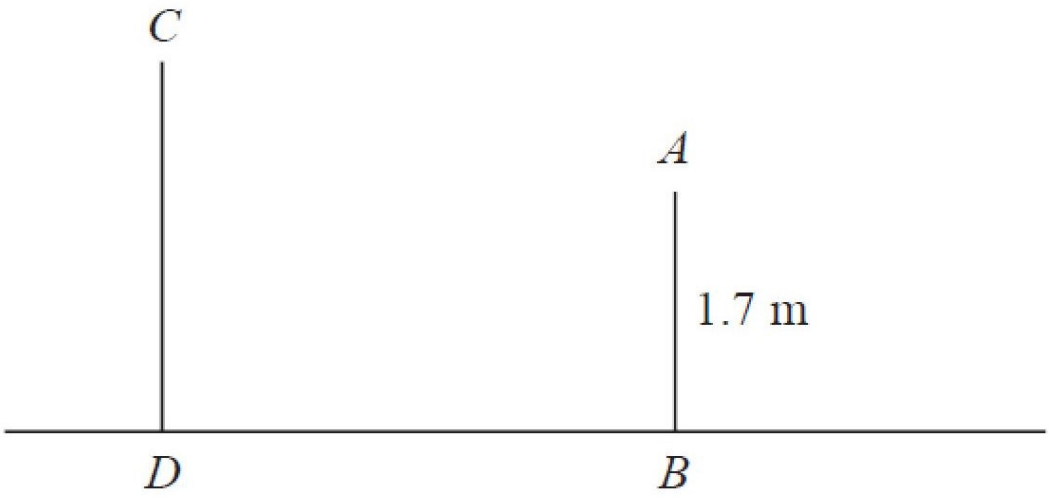
(*b*) Calculate the area of the lawn.
Show clear algebraic working.

..... m^2
(5)

(Total 7 marks)

Question 20 (AO3): 24% of students got this right

9 The diagram shows two vertical posts, AB and CD, on horizontal ground.



$AB = 1.7$ m
$CD : AB = 1.5 : 1$

The angle of elevation of C from A is 52°

Calculate the length of BD.
Give your answer correct to 3 significant figures.

Question 21 (AO2): 23% of students got this right

18. A farmer wants to estimate the number of rabbits on his farm.

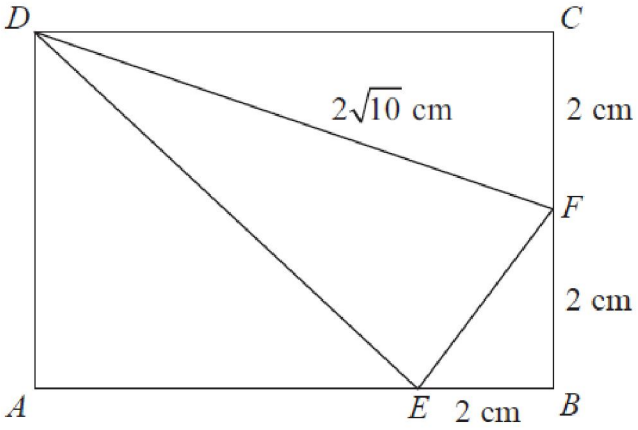
On Monday he catches 120 rabbits.
He puts a tag on each rabbit.
He then lets the rabbits run away.

On Tuesday the farmer catches 70 rabbits.
15 of these rabbits have a tag on them.

Work out an estimate for the total number of rabbits on the farm.
You must write down any assumptions you have made.

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

6. The diagram shows a triangle *DEF* inside a rectangle *ABCD*.



Show that the area of triangle *DEF* is 8 cm^2.
You must show all your working.

(Total 4 marks)

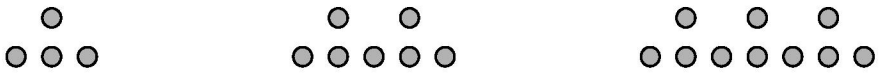
Question 23 (AO1): 22% of students got this right

11 Solve $\frac{3x-2}{4} - \frac{2x+5}{3} = \frac{1-x}{6}$

(Total for Question 11 is 4 marks)

Question 24 (AO1): 21% of students got this right

18 Here is a sequence of patterns made with counters.



pattern number 1 pattern number 2 pattern number 3

(*a*) Find an expression, in terms of n, for the number of counters in pattern number n.

Bayo has 90 counters.

(*b*) Can Bayo make a pattern in this sequence using all 90 of his counters?
You must show how you get your answer.

Question 25 (AO2): 20% of students got this right

15. Prove that, for all positive values of n,

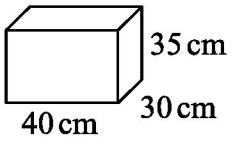
$$\frac{(n+2)^2-(n+1)^2}{2n^2+3n}=\frac{1}{n}$$

(Total 4 marks)

Question 26 (AO2): 19% of students got this right

16 Chloe has a van.

She is going to use the van to deliver boxes.
Each box is a cuboid, 40 cm by 30 cm by 35 cm.



The space for boxes in the van has

maximum length 2.4 m
maximum width 1.5 m
maximum height 1.4 m

The space for boxes is empty.
Chloe wants to put as many boxes as possible into the van.

She can put 3 boxes into the van in one minute.
Assume that the space for boxes is in the shape of a cuboid.

(*a*) Work out how many minutes it should take Chloe to put as many boxes as possible into the van.

The space for boxes might **not** be in the shape of a cuboid.

(*b*) Explain how this could affect the time it would take Chloe to put as many boxes as possible into the van.

Question 27 (AO3): 18% of students got this right

20 There are 9 counters in a bag.

There is an even number on 3 of the counters.

There is an odd number on 6 of the counters.

Three counters are going to be taken at random from the bag.

The numbers on the counters will be added together to give the total.

Find the probability that the total is an odd number.

Question 28 (AO2): 18% of students got this right

6 $100^a \times 1000^b$ can be written in the form 10^w

(*c*) Show that $w = 2a + 3b$

Answers to Qn 1 (AO1): 45% of students got this right

Question	Working	Answer	Mark	Notes
8		$t = 2(p^2 - a)$	M1	for correct first step, e.g. $p^2 = a + \frac{t}{2}$
			M1	for isolating term in t or dealing with the fraction, e.g. $p^2 - a = \frac{t}{2}$ or $2p^2 = 2a + t$
			A1	for $t = 2(p^2 - a)$ or $t = 2p^2 - 2a$

Answers to Qn 2 (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 3 (AO1): 42% of students got this right

Question	Working	Answer	Mark	Notes
14	$x = 0.4575757\ldots$ $10x = 4.575757\ldots$ $1000x = 457.575757\ldots$ $990x = 453$ **OR** $100x = 45.7575757\ldots$ $99x = 45.3$	$\frac{151}{330}$	M1 M1 A1	for $0.4575757\ldots$ or $0.4 + 0.05757\ldots$ (dep) for two recurring decimals that when subtracted would give an integer or terminating decimal or for $\frac{453}{990}$ conclusion to proof to given fraction

Answers to Qn 4 (AO2): 41% of students got this right

Paper 1MA1: 3H			
Question	**Working**	**Answer**	**Notes**
15(a)		3906	P1 1000 000 ÷ 256 A1 3906 or 3907 or 3900 or 3906.25
15(b)		Decision	C1 Decision and supporting statement Eg no never zero or yes cannot have a part error Note just yes or no will score zero

Answers to Qn 5 (AO2): 40% of students got this right

Paper 1MA1: 2H			
Question	**Working**	**Answer**	**Notes**
11 (a)		0.43	M1 for use of graph at 240 minutes A1 for 0.42 – 0.44 oe
(b)		comparison	B1 for at least one median (249 – 252 or 273 – 276) B1 for least one interquartile range (69 – 73 or 67 - 71) C1 for comment comparing average times eg females take longer than males oe C1 for comment comparing spreads of times from IQRs, eg the spread of times is about the same (NB – at least one of the comments must be in context)

Answers to Qn 6 (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 7 (AO1): 37% of students got this right

12 a Here are the first four terms of a quadratic sequence.

4 9 16 25

(a) Find an expression, in terms of n, for the nth term of this sequence.

	4	9	16	25
1st diff:	5	7	9	
2nd diff:		2	2	so $\frac{2}{2} = 1$ has n^2

	4	9	16	25	
n^2:	1	4	9	16	
Diff:	3	5	7	9	$\rightarrow 2n + 1$

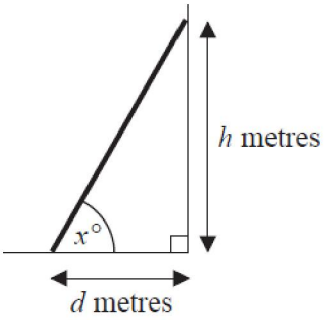
Nth term: $\boldsymbol{n^2 + 2n + 1}$

.....

(3)

Answers to Qn 8 (AO2): 36% of students got this right

11 b The foot of a ladder is on horizontal ground.
The top of the ladder is leaning against a vertical wall.



The foot of the ladder is d metres from the wall.
The top of the ladder is h metres above the ground.
The angle between the ladder and the ground is $x°$

Lula says it is safe to climb the ladder when

$$h = 3d$$

(a) Work out the value of x when $h = 3d$

Ebony says the angle between the ladder and the ground should be 70°
The ladder is moved so that $x = 70$

(b) How does this affect the height, h metres, of the top of the ladder above the ground?

If the angle is decreased to 70° then the height h will be decreased.

(1)

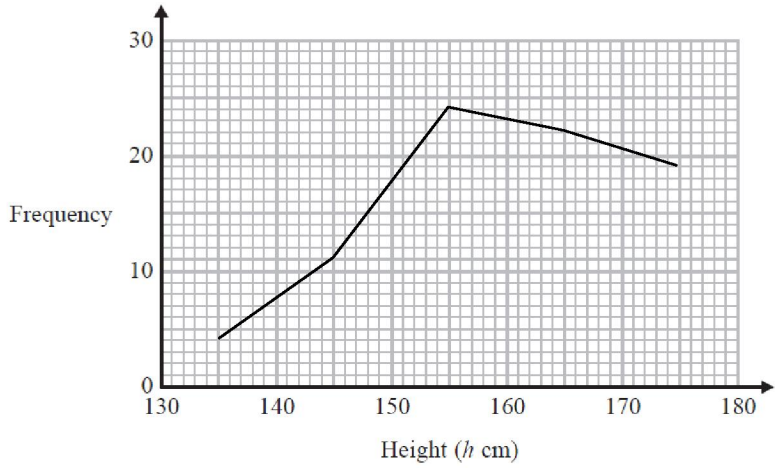
Answers to Qn 9 (AO3): 35% of students got this right

Question		Working	Answer	Mark	Notes
10			460	P1 P1 A1	for a process to find the cost after the first reduction, e.g. 293.25 ÷ 0.85 (= 345) (dep) for a complete process to find the initial cost, e.g. “345” ÷ 0.75 cao

Answers to Qn 10 (AO2): 34% of students got this right

12.			85.6	4	M1 for 360 ÷ 5 (= 72) M1 (dep) for $\frac{1}{2} \times 6^2 \times \sin"72"$ (= 17.12) M1 for completing full method to find total area of pentagon A1 for 85.5 − 85.6 OR M1 for 360 ÷ 10 (= 36) or $\frac{1}{2}(180 - 360 \div 5)$ (= 54) M1(dep) for e.g. $6 \times \sin"36" \times 6 \times \cos"36"$ (= 17.12) or $\frac{1}{2}\ 6 \times \sin"54" \times 6 \times \cos"54"$ (= 8.55) M1 for completing full method to find total area of pentagon A1 for 85.5 − 85.6

Answers to Qn 11 (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 12 (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 13 (AO1): 31% of students got this right

Question		Working	Answer	Mark	Notes
15		$\frac{5}{20}\times\frac{7}{19}+\frac{5}{20}\times\frac{8}{19}+$ $\frac{7}{20}\times\frac{5}{19}+\frac{7}{20}\times\frac{8}{19}+$ $\frac{8}{20}\times\frac{5}{19}+\frac{8}{20}\times\frac{7}{19}$ OR $\left(\frac{5}{20}\times\frac{15}{19}+\frac{7}{20}\times\frac{13}{19}+\frac{8}{20}\times\frac{12}{19}\right)$ OR $1-\left(\frac{5}{20}\times\frac{4}{19}+\frac{7}{20}\times\frac{6}{19}+\frac{8}{20}\times\frac{7}{19}\right)$		4	M1 for at least one product of the form $\frac{a}{20}\times\frac{b}{19}$ M1 for identifying all products (condone 2 errors in 6 products, 1 error in 3 products) Either $\frac{5}{20}\times\frac{7}{19},\frac{5}{20}\times\frac{8}{19},\frac{7}{20}\times\frac{5}{19},\frac{7}{20}\times\frac{8}{19},\frac{8}{20}\times\frac{5}{19},\frac{8}{20}\times\frac{7}{19}$ OR $\left(\frac{5}{20}\times\frac{15}{19},\frac{7}{20}\times\frac{13}{19},\frac{8}{20}\times\frac{12}{19}\right)$ OR $\left(\frac{5}{20}\times\frac{4}{19},\frac{7}{20}\times\frac{6}{19},\frac{8}{20}\times\frac{7}{19}\right)$ M1 (dep) for $,\frac{5}{20}\times\frac{7}{19}+\frac{5}{20}\times\frac{8}{19}+\frac{7}{20}\times\frac{5}{19}+\frac{7}{20}\times\frac{8}{19}+\frac{8}{20}\times\frac{5}{19}+\frac{8}{20}\times\frac{7}{19},$ oe OR $\left(,\frac{5}{20}\times\frac{15}{19}+\frac{7}{20}\times\frac{13}{19}+\frac{8}{20}\times\frac{12}{19},\right)$oe OR $1-\left(,\frac{5}{20}\times\frac{4}{19}+\frac{7}{20}\times\frac{6}{19}+\frac{8}{20}\times\frac{7}{19},\right)$ oe A1 for $\frac{131}{190}$ oe or 0.68947… correct to at least 2 decimal places or answer that rounds to 0.69 NB : If decimals used for products then must be correct to at least 2 decimal places **With replacement** M0 M1 for identifying all products (condone 2 errors in 6 products, 1 error in 3 products) M1 (dep) A0 for $\frac{269}{400}$ oe or 0.655 (NB: $\frac{269}{400}$ oe or 0.655 implies M2) **Partial replacement** SC: B2 for $\frac{141}{200}$ oe or 0.705 or $\frac{121}{190}$ oe or

Answers to Qn 14 (AO3): 30% of students got this right

Paper 1MA1: 2H			
Question	**Working**	**Answer**	**Notes**
9		135	B1 for identifying the angle of 70^o (on the diagram), P1 showing understanding of notation for process to find an A1 angle in triangle *ABC*, eg. for process to find angle *BAC*, eg. $(180 - 50) \div 2$ (= 65^o) for 135

Answers to Qn 15 (AO1): 29% of students got this right

13

(b) Show that the equation $x^3 - 7x + 5 = 0$ can be arranged to give $x = \frac{5}{7 - x^2}$

$5 = 7x - x^3$

$5 = x(7 - x^2)$

$x = \frac{5}{7 - x^2}$

(2)

Answers to Qn 16 (AO3): 28% of students got this right

13 Harrison wants to find out how many squirrels there are in a park.

One day he puts a tag on each of 15 of the squirrels.
The next day he catches 30 squirrels.
6 of these squirrels have tags on them.

(i) Work out an estimate for the number of squirrels in the park.

$\frac{6}{30} = \frac{15}{n}$ $n = \frac{15 \times 30}{6} = 75$

.....

(2)

Harrison assumed that none of the tags fell off during the night.

(ii) If Harrison's assumption is wrong, explain how this could affect your answer to part (i).

If tags fell off the estimate could be an overestimate since the number caught with tags might have been higher (1)

(Total for Question 13 is 4 marks)

Answers to Qn 17 (AO3): 27% of students got this right

2		39%	P1 P1 A1 P1 P1 A1	Process to find proportion of group that are students , e.g. $\frac{15}{16}$ Complete process to find the % of girls , e.g. $\frac{15}{16} \times \frac{5}{12}$ for 39(.0625) OR Process to scale up the ratio of teachers : students, so that students can be divided by 7+5 (=12),, e.g. 1 × 12 : 15 × 12 = 12 : 180 or a process to divide the "180" in the ratio 7:5,, e.g. 180 ÷ 12 × 7 (=105) **and** 180 ÷ 12 × 5 (=75) Complete process to find the % of girls , e.g. (75 ÷ (12 + 105 + 75)) × 100 for 39(.0625)

Answers to Qn 18 (AO1): 26% of students got this right

Question	Working	Answer	Mark	Notes
17		7.47	P1	for process to find volume scale factor, e.g. $1 : \frac{500}{150}$, $\left(\frac{500}{150}\right)^{\frac{1}{3}} \times 5$
			A1	7.46 – 7.47

Answers to Qn 19 (AO2): 26% of students got this right

Question		Working	Answer	Mark	Notes
9.	(b)	$(3x + 14)(2x – 7)$ (= 0)	73.5	5	M2 or $(x=)\dfrac{-7\pm\sqrt{49}+2352}{12}$ or $(x=)\dfrac{-7\pm\sqrt{2401}}{12}$ If not M2 then M1 for $(3x \pm 14)(2x \pm 7)$ or $(x=)\dfrac{-7\pm\sqrt{7^2-4\times6\times-98}}{2\times6}$ condone + in place of ± and 1 sign error. A1 Dependent on at least M1 Ignore negative root. M1ft Dependent on at least M1 and x > 0 A1 cao Dependent on first M1
		$x = 3.5$ (Area =) 6 x "3.5"^{2} or (3 × "3.5) × (2 × "3.5")			

Answers to Qn 20 (AO3): 24% of students got this right

Paper 1MA1: 3H			
Question	**Working**	**Answer**	**Notes**
9		0.664(09..)	P1 for finding the difference in height by ratio or multiplier P1 for use of tan ratio P1 (dep) for 0.85÷tan52 A1 awrt 0.664

Answers to Qn 21 (AO2): 23% of students got this right

Question		Working	Answer	Mark	Notes
18		$15 \div 70 = 120 \div n$ $120 \times 4.66(\ldots)$ OR $\frac{120 \times 70}{15}$ OR 8×70 OR $\frac{15}{70} \times 8/8 = \frac{120}{n}$ OR $120 \div 21.4 \times 100$	560	4	M2 $\frac{120 \times 70}{15}$ or $120 \times 4.66\ldots$ or 8×70 or $\frac{15}{70} \times 8/8 = \frac{120}{n}$ oe or $120 \div 21.4 \times 100$ (M1 for $\frac{15}{70}$ oe or 21.4% seen or $120 \div 15$ (= 8) or $\frac{15}{120}$ $(=\frac{1}{8})$ or $4.66(\ldots)$ seen) A1 560 cao C1 for a correct mathematical assumption eg population hasn't changed overnight or sample is random, etc.

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

Question		Working	Answer	Mark	Notes
6			8	4	M1 for $(2\sqrt{10})^2 - 2^2$ (= 36) A1 for (CD =) 6 M1 (dep on M1) for '6' × 4 – $\frac{1}{2}$ × '6' × 2 – $\frac{1}{2} \times 2 \times 2 - \frac{1}{2}$ × ('6' – 2) × 4 C1 for area of 8 from fully correct working

Answers to Qn 23 (AO1): 22% of students got this right

Question 11 (Total 4 marks)

Part	Working an or answer examiner might expect to see	Mark	Notes
	$\frac{3(3x-2)}{12} - \frac{4(2x+5)}{12} = \frac{2(1-x)}{12}$	M1	This mark is given for writing at least **two** algebraic factions with a common denominator
	$3(3x - 2) - 4(2x + 5) = 2(1 - x)$	M1	This mark is given for a method to eliminate all fractions in the equation
	$9x - 8x + 2x = 2 + 6 + 20$ $3x = 28$	M1	This mark is given for rearranging and correctly isolating terms in x
	$x = 9\frac{1}{3}$	A1	This mark is given for the correct answer only

Answers to Qn 24 (AO1): 21% of students got this right

Part	Working or answer an examiner might expect to see	Mark	Notes
18 (a)	4 7 10 3 3	1	This mark is given for a method to find the *n*th term
	$3n + 1$	1	This mark is given for the correct answer only
18 (b)	If $3n + 1 = 90$, then $n = 29.666\ldots$	1	This mark is given for showing that 89 is not divisible by 3
	No, the pattern can't be made.	1	This mark is given for a correct conclusion supported by argument

Answers to Qn 25 (AO2): 20% of students got this right

Question		Working	Answer	Mark	Notes
15		$(n^2 + 4n + 4) - (n^2 + 2n + 1)$ $\frac{2n+3}{2n^2+3n}$ $\frac{2n+3}{n(2n+3)}$	Proof	4	M1 for correct method to expand $(n + 2)^2$ or $(n + 1)^2$ M1 for correct simplification of numerator M1 for factorisation of $2n^2 + 3n$ **or** for clearing the fractions on both sides correctly C1 for complete and correct proof **OR** M1 for $\{(n+2) - (n+1)\}\{(n+2) + (n+1)\}$ M1 for $1 \times (2n+3)$ M1 for factorisation of $2n^2 + 3n$ **or** for clearing the fractions on both sides correctly C1 for complete and correct proof **OR** M1 for $n\{(n+2)^2 - (n+1)^2\} = (2n^2 + 3n) \times 1$ M1 for $n(n+2)^2 - n(n+1)^2$ or for correct expansion of $(n+2)^2 - (n+1)^2$ M1 for correct expansion of $n\{(n+2)^2 - (n+1)^2\}$ C1 for complete and correct proof (must include statement recognising the equality of LHS and RHS)

Answers to Qn 26 (AO2): 19% of students got this right

Part	Working or answer an examiner might expect to see	Mark	Notes
16 (a)	$0.40 \times 0.30 \times 0.35 = 0.042$	1	This mark is given for finding the volume of one box
	$2.4 \times 1.5 \times 1.4 = 5.04$	1	This mark is given for finding the volume of the van
	$5.04 \div 0.42 = 120$	1	This mark is given for finding how many boxes will fit in the van
	$120 \div 3 = 40$	1	This mark is given for finding how long it will take Chloe to put the boxes in the van
16 (b)	She will not be able to load as many boxes, so it will take less time	1	This mark is given for a correct statement

Answers to Qn 27 (AO3): 18% of students got this right

Question	Working	Answer	Mark	Notes
20	P(OOO) $\frac{6}{9}\times\frac{5}{8}\times\frac{4}{7}=\frac{120}{504}$ P(OEE) $\frac{6}{9}\times\frac{3}{8}\times\frac{2}{7}=\frac{36}{504}$ P(EOE) $\frac{3}{9}\times\frac{6}{8}\times\frac{2}{7}=\frac{36}{504}$ P(EEO) $\frac{3}{9}\times\frac{2}{8}\times\frac{3}{7}=\frac{36}{504}$ P(odd) $\frac{120}{504}+\frac{36}{504}+\frac{36}{504}+\frac{36}{504}$ P(EEE) $\frac{3}{9}\times\frac{2}{8}\times\frac{1}{7}=\frac{6}{504}$ P(EOO) $\frac{3}{9}\times\frac{6}{8}\times\frac{5}{7}=\frac{90}{504}$ P(OEO) $\frac{6}{9}\times\frac{3}{8}\times\frac{5}{7}=\frac{90}{504}$ P(OOE) $\frac{6}{9}\times\frac{5}{8}\times\frac{3}{7}=\frac{90}{504}$ P(odd) $1-\left(\frac{6}{504}+\frac{90}{504}+\frac{90}{504}+\frac{90}{504}\right)$	$\frac{228}{504}$	P1 P1 P1 P1 A1 **OR** P1 P1 P1 P1 A1	for a "second choice" denominator of 8 for one correct product of 3 probabilities for all four correct products of 3 probabilities for a fully correct process to find the probability of the sum being odd oe for a "second choice" denominator of 8 for one correct product of 3 probabilities (method to use 1 – p(odd)) for all four correct products of 3 probabilities for a fully correct process to find the probability of the sum being odd oe

Answers to Qn 28 (AO2): 18% of students got this right

Paper: 1MA1/2H				
Question	**Working**	**Answer**	**Mark**	**Notes**
6 (c)		Shown	M1	for writing 100^a or 1000^b as a power of 10 ($=10^{2a}$ or 10^{3b}) or 10^{2a+3b} or $100 = 10^2$ and $1000 = 10^3$
			C1	for complete chain of reasoning leading to conclusion