ADA PINPOINT PACKS

16_to_54_Percent_Pinpoint_AI_Pack

Made for Grade4to5_Paper3

AO1,2_and_3

ALL_Strands

Calc_Only

Created by A.D.A:

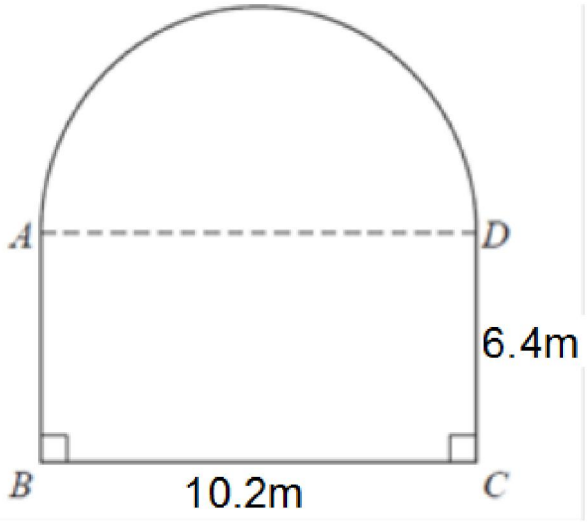
Pinpoints Automatic Differention Algorithmn

Designed and Programmed by

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

Question 1 (AO2): 82% of students got this right

7b A garden is in the shape of a rectangle, *ABCD*, and a semicircle.
AD is the diameter of the semicircle.



Greg is going to cover the garden with fertiliser.

Carol has been told that one box of fertiliser will cover 15 m^2 of garden.

Greg finds out that one box of fertiliser will cover more than 15 m^2 of garden.

(b) Explain how this might affect the number of boxes he needs to buy.

.....

.....

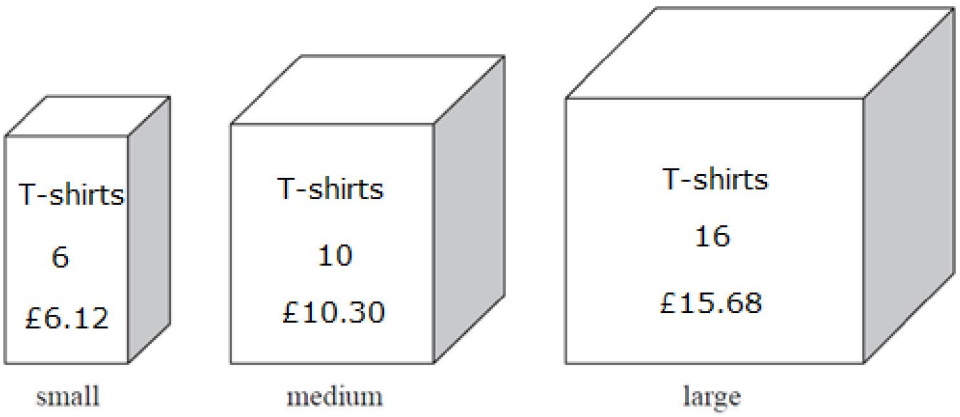
.....

.....

(1)

Question 2 (AO1): 80% of students got this right

***6.** T-shirts are sold in three different sized boxes.



A small box contains 6 T-shirts and costs £6.12.
A medium box contains 10 T-shirts and costs £10.30.
A large box contains 16 T-shirts and costs £15.68.

Which size of box gives the best value for your money?
Show all steps in your calculations.

(Total 4 marks)

Question 3 (AO1): 79% of students got this right

1 Solve $5x - 6 = 3(x - 1)$

Question 4 (AO1): 77% of students got this right

11. Write the number 47 805 000 in standard form.

.....

(Total for Question 11 is 1 mark)

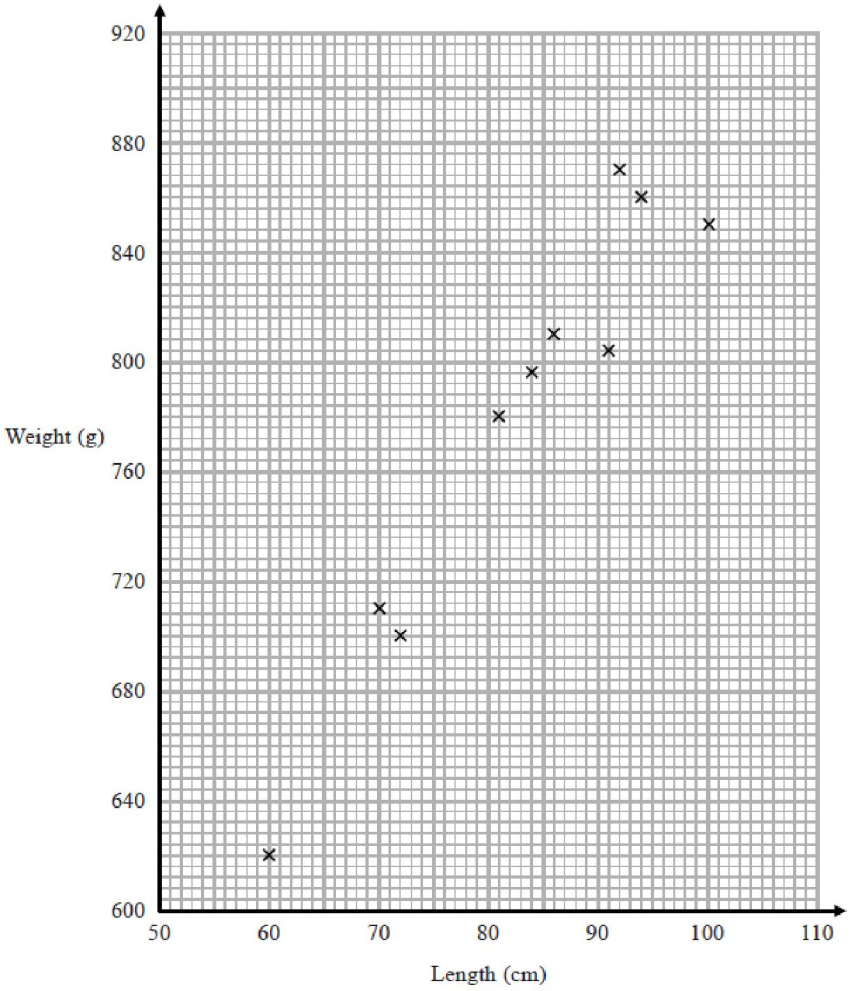
Question 5 (AO1): 76% of students got this right

16 (i) Find the value of $\sqrt[5]{3.2 \times 10^{11}}$

(ii) Find the value of $10^{\frac{3}{4}}$
Give your answer correct to 1 decimal place.

Question 6 (AO2): 73% of students got this right

10. The scatter graph shows information about 10 adult snakes of the same type.
It shows the length and weight of each snake.



An adult snake of this type has a weight of 740 g.

(a) Use the scatter graph to estimate the length of this snake.

..... cm
(2)

Steven wants to estimate the weight of an adult snake of length 110 cm.

He says he will draw a line of best fit and read off the weight at 110 cm.

(b) Explain what is wrong with his method.

.....

.....
(1)

(Total for Question 10 is 3 marks)

Question 7 (AO1): 71% of students got this right

5. Ben goes on holiday to Hong Kong.

In Hong Kong, Ben sees a camera costing HK$3179.55.
In London, an identical camera costs £285.

The exchange rate is £1 = HK$12.30.

Ben buys the camera in Hong Kong.

How much cheaper is the camera in Hong Kong than in London?

.....

(Total for Question 5 is 3 marks)

Question 8 (AO2): 70% of students got this right

6. Henry is thinking about having a water meter.

These are the two ways he can pay for the water he uses.

Water Meter

A charge of £28.20 per year

plus

91.22p for every cubic metre of water used

1 cubic metre = 1000 litres

No Water Meter

A charge of £107 per year

Henry uses an average of 180 litres of water each day.

Henry wants to pay as little as possible for the water he uses.
Should Henry have a water meter?

(Total 5 marks)

Question 9 (AO3): 69% of students got this right

9. The diagram shows a large tin of pet food in the shape of a cylinder.

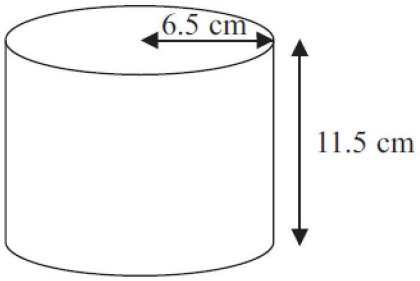


Diagram **NOT** accurately drawn

The large tin has a radius of 6.5 cm and a height of 11.5 cm.

A pet food company wants to make a new size of tin.

The new tin will have a radius of 5.8 cm.
It will have the same volume as the large tin.

Calculate the height of the new tin.
Give your answer correct to one decimal place.

..... cm

(Total 3 marks)

Question 10 (AO2): 68% of students got this right

1. x is a number.
Another number is 9 greater than x.
Both numbers are whole numbers.

The total of the two numbers is less than 60

(*b*) Find the greatest possible value of x.

.....

(3)

Question 11 (AO2): 67% of students got this right

3 Mohammed is z years old.
Aaron is three times as old as Mohammed.
Joel is two years older than Mohammed.

In total, they are 102 years.

Determine the age of each individual.

Mohammed.....years

Aaron.....years

Joel.....years

(Total 4 marks)

Question 12 (AO1): 65% of students got this right

7a Chika finds out the price of a Gift set in three different countries.

The price is

£97 in the UK
$131.99 in the USA
€135.99 in Germany

The exchange rates are

£1 = $1.39
€1 = £0.75

Chika wants to pay the cheapest price for the gift set.

(a) From which country should Chika buy the box set?
You must show how you get your answer.

.....

(3)

Question 13 (AO1): 64% of students got this right

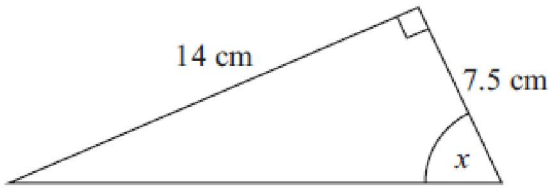
15. Simplify $\frac{x+1}{2} + \frac{x+3}{3}$

.....

(Total 3 marks)

Question 14 (AO1): 63% of students got this right

7. Here is a right-angled triangle.



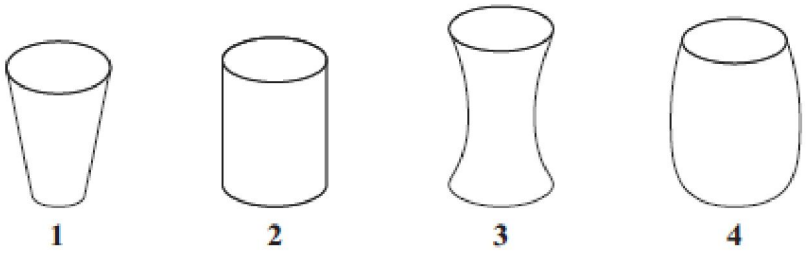
Work out the size of the angle marked x.
Give your answer to the nearest degree.

.....°

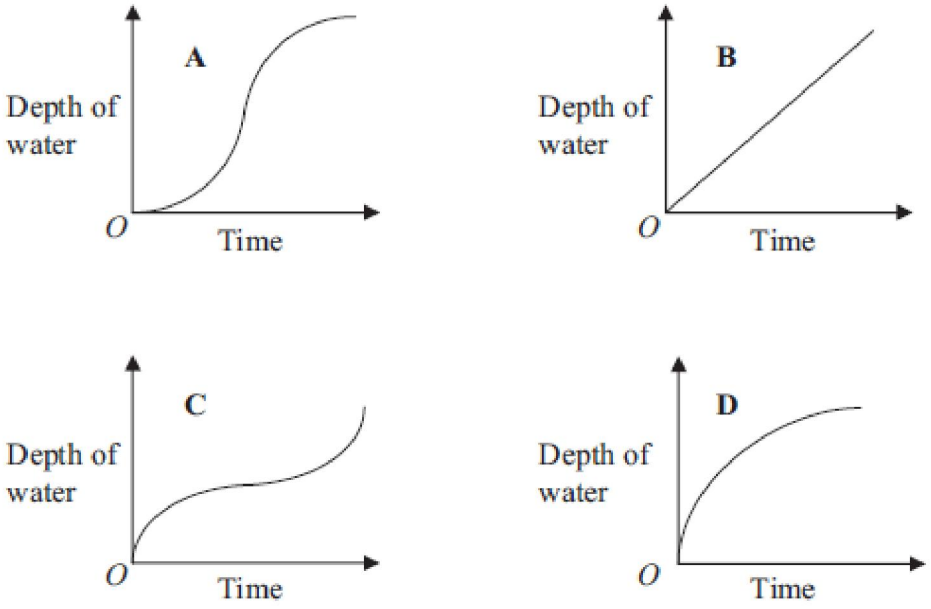
(Total 3 marks)

Question 15 (AO2): 61% of students got this right

3. 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 16 (AO2): 60% of students got this right

***11.** The diagram shows the cross section of a ball.

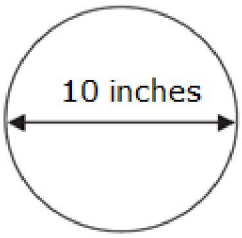


Diagram **NOT** accurately drawn

The cross section of the ball is a circle.
The ball has a diameter of 10 inches.

A rope is going to be put around the ball.
The ropes can be bought in 70 cm lengths.

1 inch is 2.54 cm.

Determine if one rope is long enough to go around the ball.
Show all steps in your calculations.

(Total for 4 marks)

Question 17 (AO1): 59% of students got this right

14. Solve the simultaneous equations

$$4x + 6y = 5$$
$$7x + 5y = -10.5$$

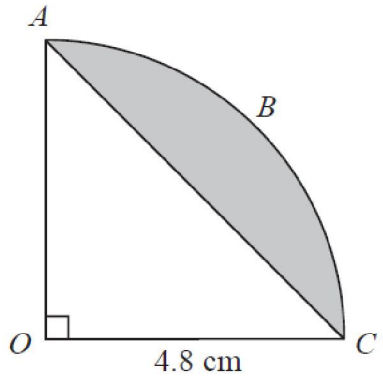
x = ...

y = ...

(Total for Question 14 is 4 marks)

Question 18 (AO3): 57% of students got this right

7



The arc ABC is a quarter of a circle with centre O and radius 4.8 cm.
AC is a chord of the circle.

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

Question 19 (AO1): 56% of students got this right

11 Solve the simultaneous equations

$$2x - 4y = 19$$
$$3x + 5y = 1$$

Question 20 (AO1): 55% of students got this right

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

A washing machine has a sale price of £464

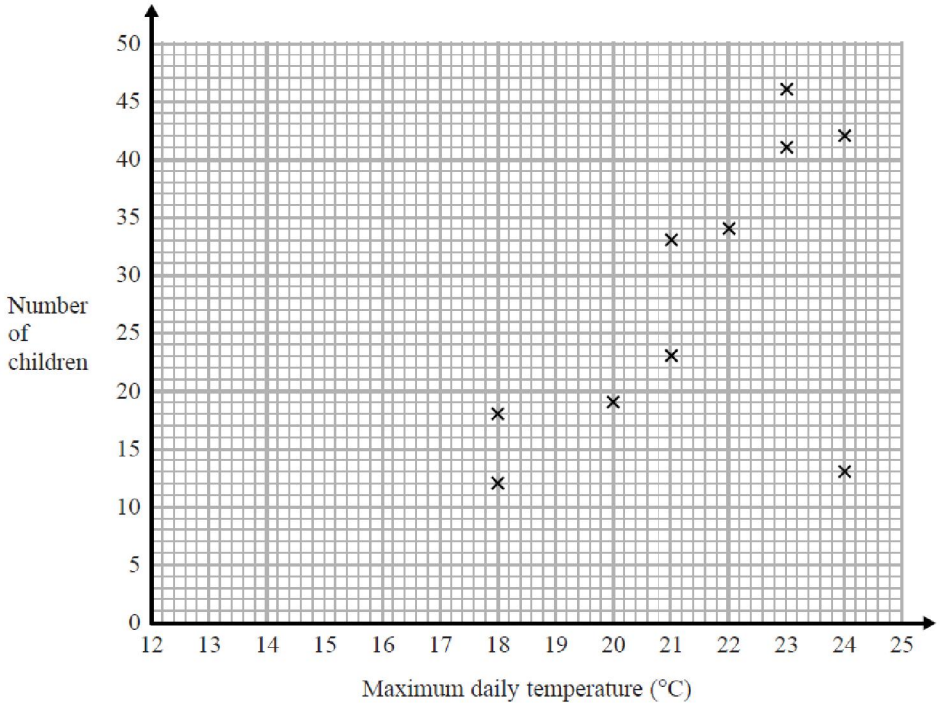
By how much money is the normal price of the washing machine reduced?

£ .....

(Total 3 marks)

Question 21 (AO1): 53% of students got this right

3d 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 22 (AO1): 52% of students got this right

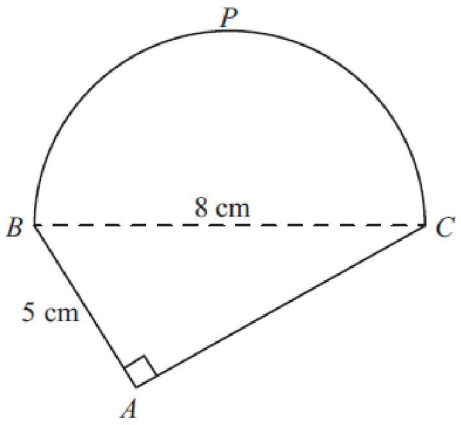
9b (b) Work out the value of $(3.4 \times 10^{-3}) \div (1.7 \times 10^{6})$
Give your answer in standard form correct to 3 significant figures.

.....

(2)

Question 23 (AO3): 52% of students got this right

10. Here is a shape.



BPC is a semicircle.
ABC is a right-angled triangle.
BC = 8 cm.
AB = 5 cm.

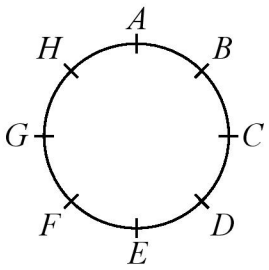
Work out the perimeter of the shape.
Give your answer correct to 3 significant figures.

..... cm

(Total 5 marks)

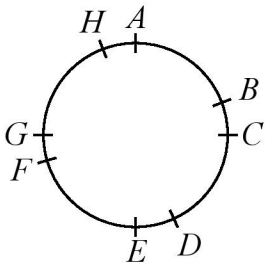
Question 24 (AO2): 50% of students got this right

3 Hasmeet walks once round a circle with diameter 80 metres.



There are 8 points equally spaced on the circumference of the circle.

Four of the points are moved, as shown in the diagram below.



Hasmeet walks once round the circle again.

(*b*) Has the mean distance that Hasmeet walks between one point and the next point changed?

You must give a reason for your answer.

Question 25 (AO1): 49% of students got this right

3 A gold bar has a mass of 12.5 kg.

The density of gold is 19.3 g/cm^3

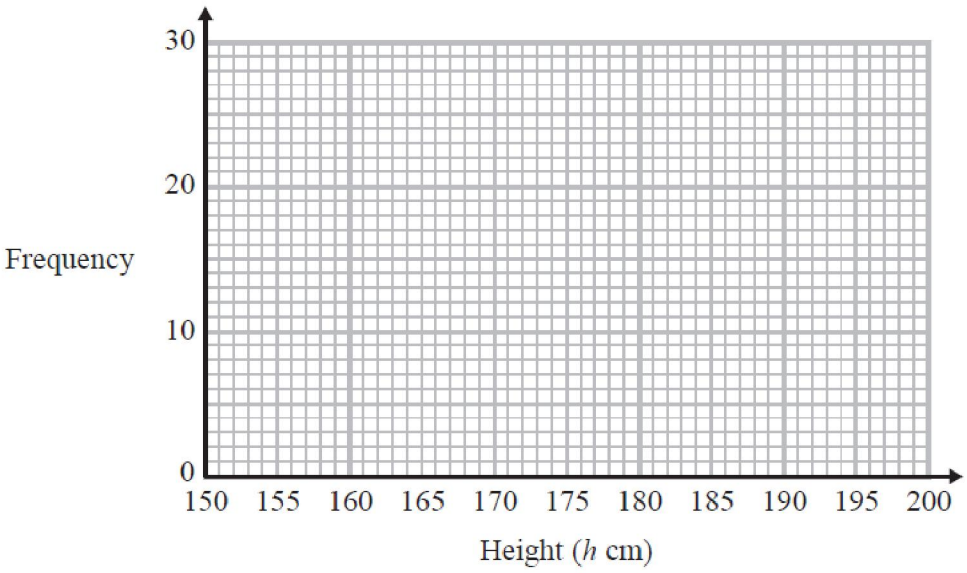
Work out the volume of the gold bar.
Give your answer correct to 3 significant figures.

Question 26 (AO1): 48% of students got this right

8. The frequency table gives information about the heights of some people.

Height (h cm)	**Frequency**
$160 < h \leq 165$	2
$165 < h \leq 170$	5
$170 < h \leq 175$	10
$175 < h \leq 180$	21
$180 < h \leq 185$	16
$185 < h \leq 190$	4

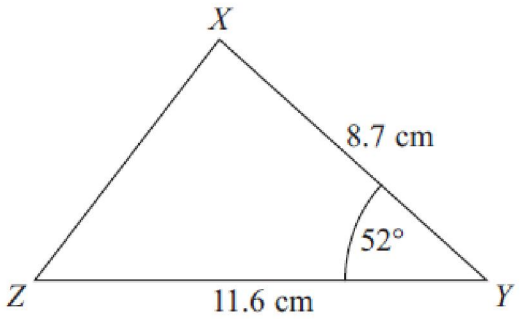
Draw a frequency polygon for this information.



(Total for Question 8 is 2 marks)

Question 27 (AO1): 46% of students got this right

17.



In the triangle *XYZ*

XY = 8.7 cm,
YZ = 11.6 cm,
Angle *XYZ* = 52°

(a) Work out the area of triangle *XYZ*.
Give your answer correct to 3 significant figures.

..... cm^2
(2)

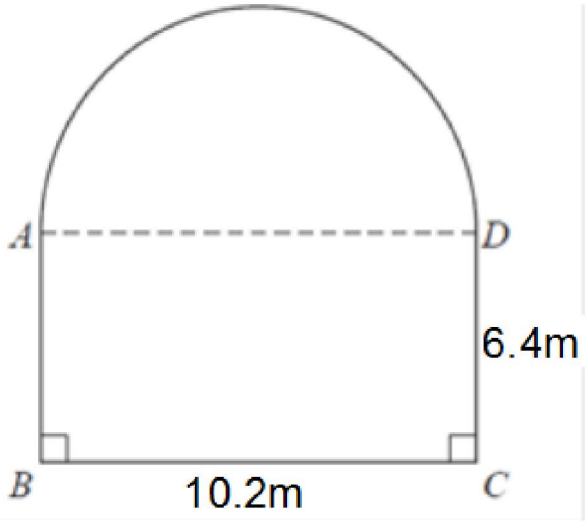
(b) Work out the length of *XZ*.
Give your answer correct to 3 significant figures.

..... cm
(3)

(Total 5 marks)

Answers to Qn 1 (AO2): 82% of students got this right

7b A garden is in the shape of a rectangle, *ABCD*, and a semicircle.
AD is the diameter of the semicircle.



Greg is going to cover the garden with fertiliser.

Carol has been told that one box of fertiliser will cover 15 m^2 of garden.

Greg finds out that one box of fertiliser will cover more than 15 m^2 of garden.

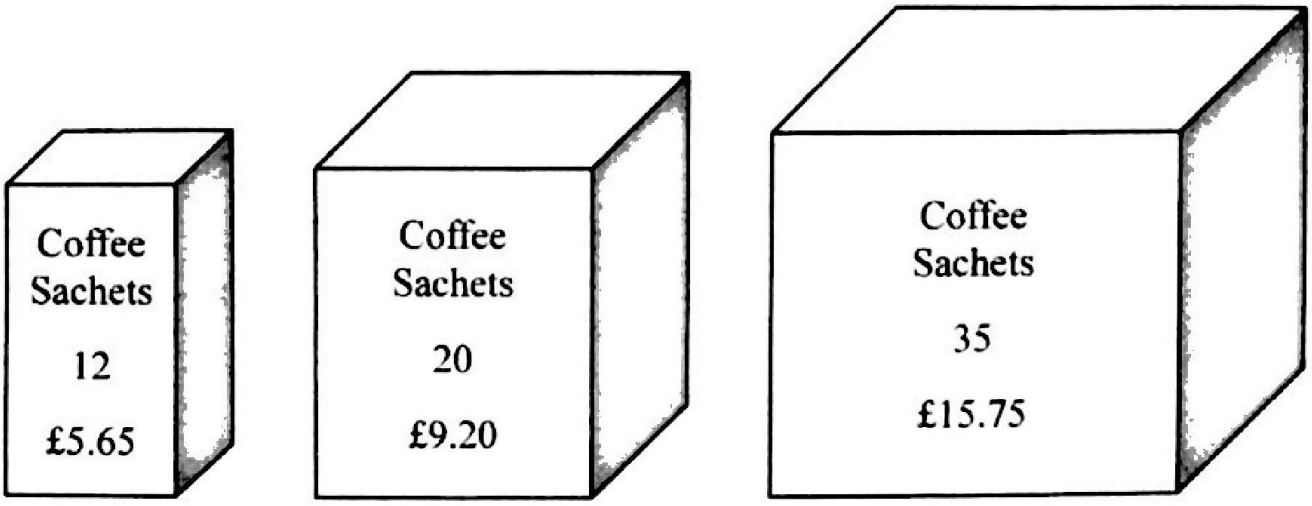
(b) Explain how this might affect the number of boxes he needs to buy.

He may need to buy fewer boxes

(1 mark)

Answers to Qn 2 (AO1): 80% of students got this right

***6** Coffee sachets are sold in three different sizes of box.



small medium large

A small box has 12 coffee sachets and costs £5.65
A medium box has 20 coffee sachets and costs £9.20
A large box has 35 coffee sachets and costs £15.75

Work out which size of box gives the best value for money.
You must show all your working.

$\frac{5.65}{12} = £0.47$ per pack

$\frac{9.20}{20} = £0.46$

$\frac{15.75}{35} = £0.45$

Large is best value.

Answers to Qn 3 (AO1): 79% of students got this right

Paper: 1MA1/2H				
Question	**Working**	**Answer**	**Mark**	**Notes**
1		$1\frac{1}{2}$	M1	for correct expansion of the bracket or dividing all terms by 3 as a first step eg $3x - 3$ or $(5x - 6)/3 = 3(x - 1)/3$
			M1	for isolating terms in x on one side of an equation eg $5x - 6 - 3x = -3$ or both constants on one side of an equation, eg $5x = 3x - 3 + 6$, ft $5x - 6 = 3x - 1$
			A1	for $1\frac{1}{2}$ oe

Answers to Qn 4 (AO1): 77% of students got this right

11		4.7805×10^7	B1	cao

Answers to Qn 5 (AO1): 76% of students got this right

Paper 1MA1: 2H			
Question	**Working**	**Answer**	**Notes**
16 (i)		200	B1 cao
(ii)		5.6	B1 For 5.6(2...)

Answers to Qn 6 (AO2): 73% of students got this right

10(a)		72 – 80	M1	For a single line segment with a positive gradient that could be used as a line of best fit or a horizontal line from 740 or a point plotted at (x, 740) where x is in the range 72 – 80
			A1	Answer in range 72 – 80
(b)		Explanation	B1	Explanation, e.g. 110 cm is outside of the range of the data, the line of best fit cannot be extended that far

Answers to Qn 7 (AO1): 71% of students got this right

5 Ben goes on holiday to Hong Kong.

In Hong Kong, Ben sees a camera costing HK$3179.55
In London, an identical camera costs £285

The exchange rate is £1 = HK$12.30

Ben buys the camera in Hong Kong.

How much cheaper is the camera in Hong Kong than in London?

Method 1: change £285 to HK$

£1 = HK$12.30

£285 = HK$3505.50 in London

HK$3179.55 in Hong Kong

HK$325.95 cheaper in Hong Kong

OR

Method 2: change HK$3179.55 to £

£1 : HK$12.30) x $\frac{3179.55}{12.30}$

£258.50 : HK$3179.55

in Hong Kong

(Total for Question 5 is 3 marks)

£285 − £258.50 = £26.50 cheaper in Hong Kong

Answers to Qn 8 (AO2): 70% of students got this right

	6.	180 × 365 = 65700 65700 ÷1000 = 65.7 65.7 × 91.22 = 5993.154 5993.154÷100 + 28.20 = 88.13... D U C T 366 65880 6010 88.30 365 65700 5993 88.13 65000 5929 87.49 66000 6020 88.40 364 65520 5976 87.96 360 64800 5911 87.31 ~~336~~ ~~60480~~ 5517 83.37	Decision (should have a water meter installed)	5	**Per year** M1 for 180 × '365' (= 65700) M1 for '65700' ÷ 1000 (= 65.7 or 65 or 66) M1 for '65.7' × 91.22 (= 5993...) A1 for answer in range (£)87 to (£)89 C1 (dep on at least M1) for conclusion following from working seen **OR (per day)** M1 for 107 ÷ '365' (= 0.293…) M1 for 180 ÷ 1000 × 91.22 (= 16.4196) M1 for 28.2 ÷ '365' + '0.164196' (units must be consistent) A1 for 29 – 30(p) and 24 – 24.3(p) (or equivalent) C1 (dep on at least M1) for conclusion following from working seen **OR** M1 for (107 – 28.20) ÷ 0.9122 (= 86.384..) M1 for '86.384..'× 1000 (= 86384.5…) M1 for '365' × 180 (= 65700) A1 for 65700 and 86384.5... C1 (dep on at least M1) for conclusion following from working seen NB : Allow 365 or 366 or 52×7 (=364) or 12 × 30 (=360) or 365¼ for number of days

Answers to Qn 9 (AO3): 69% of students got this right

9.			14.4	3	M1 for $\pi \times 6.5^2 \times 11.5$ (= 1526.42...) M1 (dep) for $\frac{\text{'1526.42...'}}{\pi \times 5.8^2}$ A1 for 14.4 – 14.5 **OR** M1 for $\frac{5.8}{6.5}$ or $\frac{6.5}{5.8}$ or 0.89(23…) or 1.12(06896…) M1 for $11.5 \div \left(\frac{5.8}{6.5}\right)^2$ or $11.5 \div \left(\frac{6.5}{5.8}\right)^2$ A1 for 14.4 – 14.5

Answers to Qn 10 (AO2): 68% of students got this right

1.	(*b*)	$x + x + 9 < 60$ $2x < 51$ $x < 25.5$	25	3	M1 for $x + x + 9$ oe A2 cao (A1 for 25.5) **OR** M1 for 60 ÷ 2 (=30) and 9 ÷ 2 (=4.5) A2 cao (A1 for 25.5) **OR** M1 for 60 – 9 (=51) and "51" ÷ 2 (=25.5) A2 cao (A1 for 25.5) **OR** M1 for at least 2 trials with correct totals A2 cao (A1 for correct trial of 25 and 26)

Answers to Qn 11 (AO2): 67% of students got this right

3			20 60 22	4	M1 for $3z$ or $z + 2$ M1 for adding their three expressions and setting equal to 102 M1 for correct method to solve $ay + b = 102$ A1 Mohammed 20, Aaron 60, Joel 22

Answers to Qn 12 (AO1): 65% of students got this right

7a Chika finds out the price of a Gift set in three different countries.

The price is

£97 in the UK
$131.99 in the USA
€135.50 in Germany

The exchange rates are

£1 = $1.39
€1 = £0.75

Chika wants to pay the cheapest price for the gift set.

(a) From which country should Chika buy the box set?
You must show how you get your answer.

UK: $97 \times 1.39 = \$134.83$
so UK > USA

Germany: $135.50 \times 0.75 = £101.63$
so Germany > UK > USA

Hence the cheapest country to buy the set in is the **USA**

.....

(3)

Answers to Qn 13 (AO1): 64% of students got this right

	15.	$\frac{3(x+1)}{6}+\frac{2(x+3)}{6}=\frac{3x+3+2x+6}{6}$	$\frac{5x+9}{6}$	3	M1 Use of common denominator of 6 (**or** any other multiple of 6) and at least one numerator correct, e.g. $\frac{3(x+1)}{6}$ or $\frac{2(x+3)}{6}$ M1 $\frac{3(x+1)}{6}+\frac{2(x+3)}{6}$ (oe) A1 cao

Answers to Qn 14 (AO1): 63% of students got this right

7.		$\tan x = 14 \div 7.5 = 1.8666\ldots$ $\tan^{-1} 1.8666\ldots$	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 15 (AO2): 61% of students got this right

Question		Working	Answer	Mark	Notes
3			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 16 (AO2): 60% of students got this right

***11** The diagram shows the top of Levi's birthday cake.

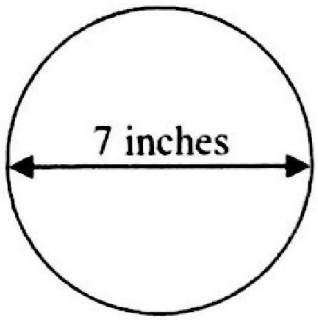


Diagram **NOT** accurately drawn

The top of the cake is in the shape of a circle.
The diameter of the circle is 7 inches.

A ribbon is going to be put around the side of the cake.
Ribbons are sold in 50 cm lengths.

1 inch is 2.54 cm.

Work out if one length of ribbon is long enough to go all the way around the cake.
You must show your working.

$55 \times (7 \times 2.54) = 55.857...$ cm

No.

Answers to Qn 17 (AO1): 59% of students got this right

14		$x = -4$ $y = 3.5$	M1 A1 M1 A1	Process to eliminate one variable or rearrangement of one equation leading to substitution (condone 1 arithmetic error) For either $x = -4$ or $y = 3.5$ (dep on M1) correct substitution of found value or a correct process after starting again (condone one arithmetic error) cao

Answers to Qn 18 (AO3): 57% of students got this right

Paper 1MA1: 2H			
Question	**Working**	**Answer**	**Notes**
7	$\frac{1}{4} \times \pi \times 4.8^2$ $\frac{1}{2} \times 4.8 \times 4.8$ $\frac{1}{4} \times \pi \times 4.8^2 - \frac{1}{2} \times 4.8 \times 4.8$	6.58	B1 for use of formula for area of a circle P1 for complete process to find area of shaded region A1 for 6.56 – 6.58

Answers to Qn 19 (AO1): 56% of students got this right

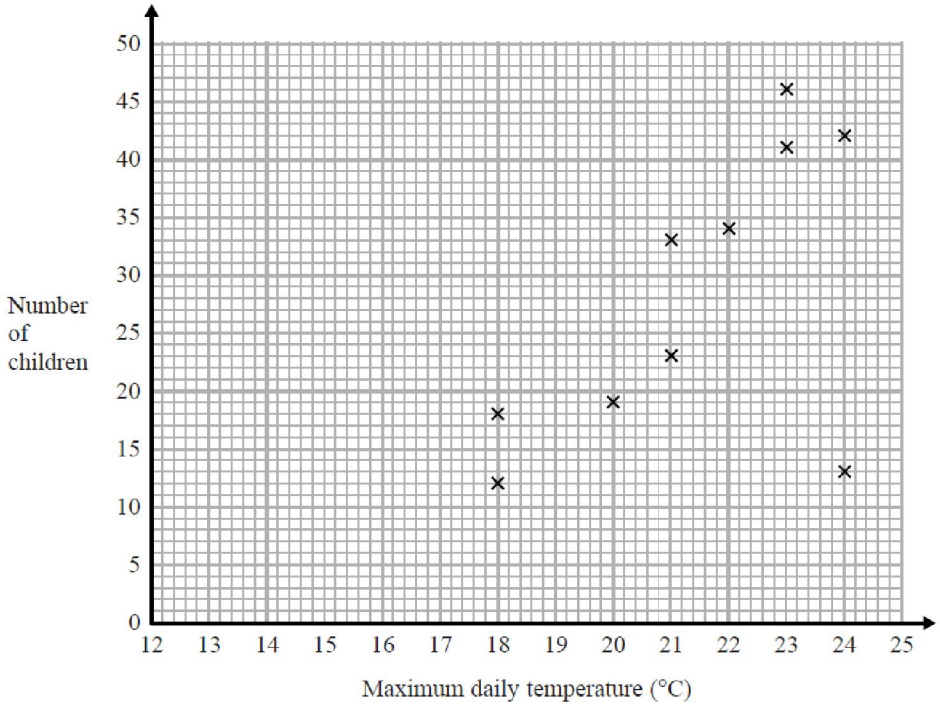
Paper 1MA1: 3H			
Question	**Working**	**Answer**	**Notes**
11		$x = 4.5$ $y = -2.5$	M1 for a correct process to eliminate one variable (condone one arithmetic error) A1 cao for either x or y M1 (dep) for substituting found value into one of the equations or appropriate method after starting again (condone one arithmetic error) A1 cao

Answers to Qn 20 (AO1): 55% of students got this right

9.			116	3	M1 for 80% or 0.8 seen oe or $\frac{464}{0.8}$ (= 580) M1 for $\frac{464}{0.8} - 464$ A1 cao **OR** M1 for 80% or 0.8 seen oe M1 for 464 ÷ 4 or 464 ÷ (80÷20) A1 cao

Answers to Qn 21 (AO1): 53% of students got this right

3d 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.

15° lies outside the range of temperatures for this data
OR extrapolation is unreliable

(1)

Answers to Qn 22 (AO1): 52% of students got this right

9b (b) Work out the value of $(3.4 \times 10^{-3}) \div (2.1 \times 10^{6})$
Give your answer in standard form correct to 3 significant figures.

$\mathbf{1.62 \times 10^{-9}}$

(1 mark for 1.62 1 mark for 10^{-9})

.....

(2)

Answers to Qn 23 (AO3): 52% of students got this right

Question		Working	Answer	Mark	Notes
10.			23.8	5	M1 for $8^2 - 5^2$ or $AC^2 + 5^2 = 8^2$ M1 for $\sqrt{(8^2 - 5^2)}$ (=6.24(4..)) with least one of 8^2 or 5^2 correctly evaluated. M1 for 8π (=25.13 to 25.13(2…)) or $8\pi \div 2$ or 4π (=12.56(6…)) using $\pi = 3.14$ or better M1 for 5 + their AC + their arc PBC A1 for 23.7 – 23.9

Answers to Qn 24 (AO2): 50% of students got this right

Paper: 1MA1/2H				
Question	**Working**	**Answer**	**Mark**	**Notes**
3 (b)		No (supported)	C1	Mean distance stays the same with reason, eg total distance remains unchanged or same number of points

Answers to Qn 25 (AO1): 49% of students got this right

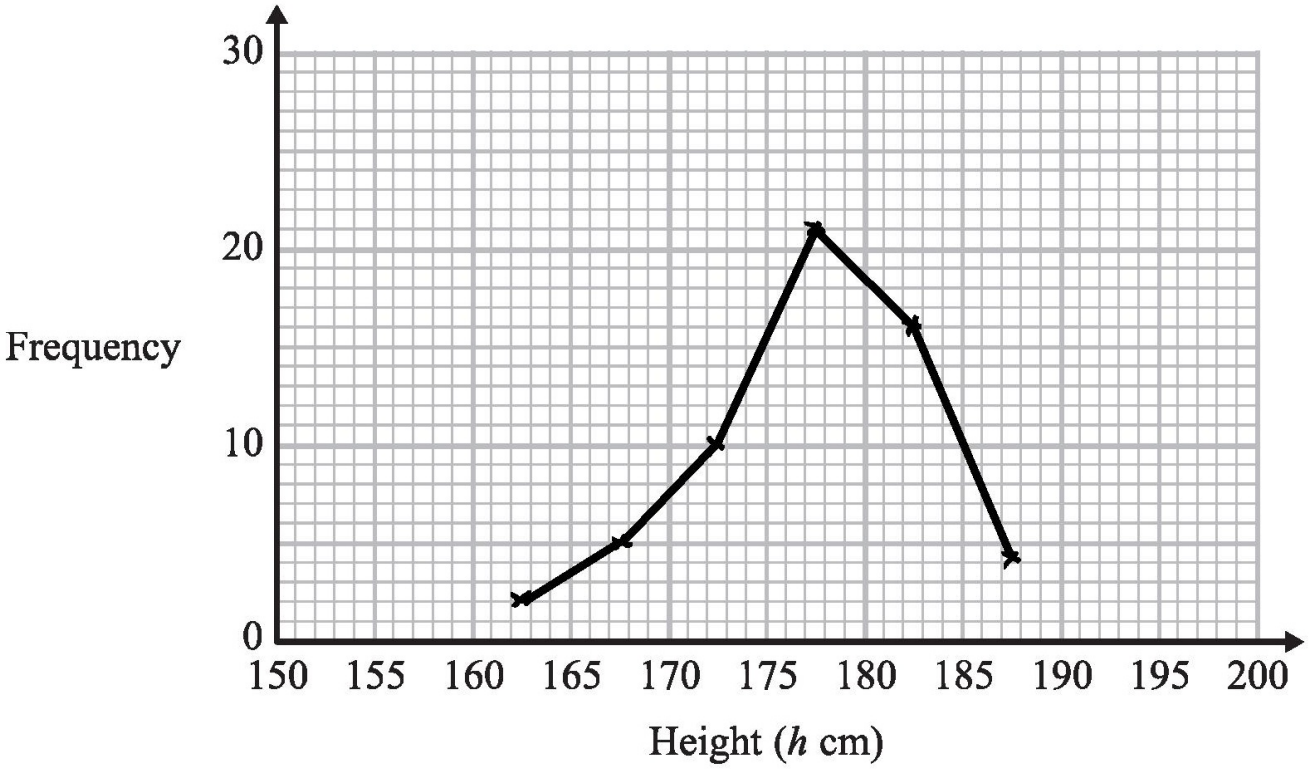
Part	Working or answer an examiner might expect to see	Mark	Notes
3	12.5×1000	1	This mark is given for converting kg to g
	$12\,500 \div 19.3$	1	This mark is given for a method to find the density of the gold bar
	648	1	This mark is given for the correct answer only

Answers to Qn 26 (AO1): 48% of students got this right

8 The frequency table gives information about the heights of some people.

Height (h cm)	Frequency
$160 < h \leqslant 165$	2
$165 < h \leqslant 170$	5
$170 < h \leqslant 175$	10
$175 < h \leqslant 180$	21
$180 < h \leqslant 185$	16
$185 < h \leqslant 190$	4

Draw a frequency polygon for this information.



Answers to Qn 27 (AO1): 46% of students got this right

17.	(a)	$\frac{1}{2}\times 11.6\times 8.7\times \sin 52^{o}$	39.8	2	M1 $\frac{1}{2}\times 11.6\times 8.7\times \sin 52^{o}$ or complete method to find area using trig and/or Pythagoras and ½ base × height A1 39.75 – 39.8
	(b)	XZ^2 $= 8.7^2 + 11.6^2 - 2 \times 8.7 \times 11.6 \times \cos 52°$ $= 85.985$	9.27	3	M1 $8.7^2 + 11.6^2 - 2 \times 8.7 \times 11.6 \times \cos 52°$ M1 for correct order of evaluation or 85.985 A1 answer in the range 9.27 – 9.275