# PINPOINT REVISION PACKS

## 70_to_90_Percent_Pinpoint_AI_Pack

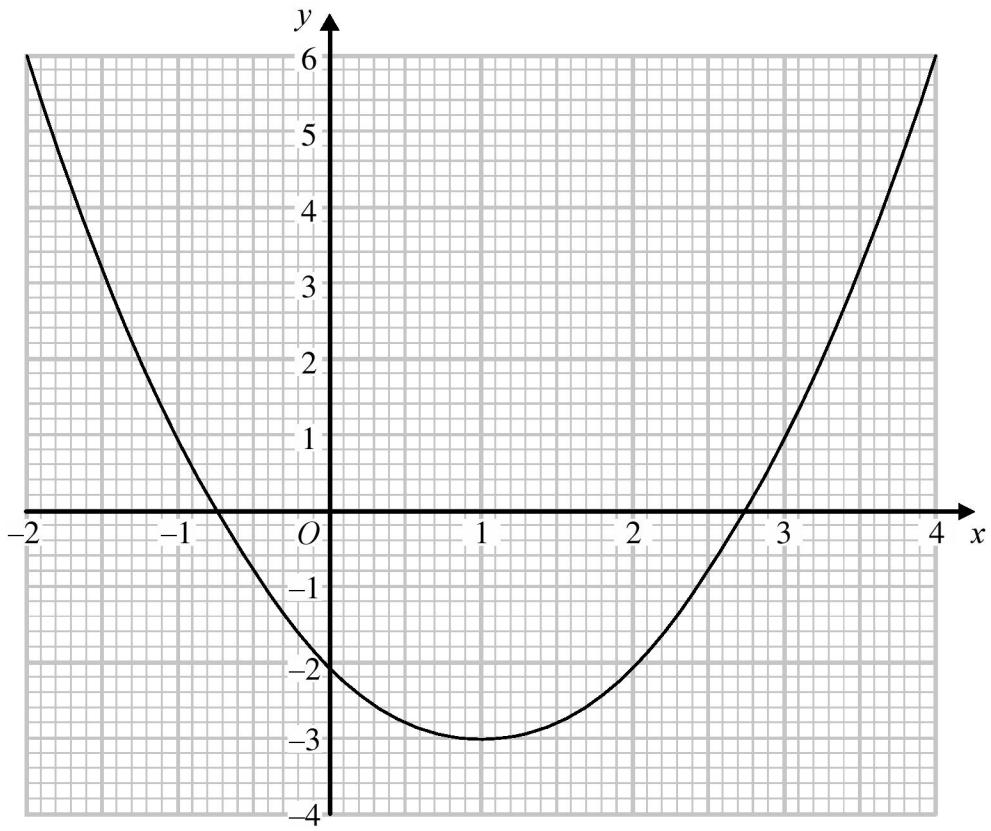
## Time Allocation = 80mins , Max = 71 Marks

# Calculated Grade Boundaries:

| Grade | Marks |
|---|---|
| 7 | 12 |
| 7+ | 24 |
| 8- | 36 |
| 8 | 48 |
| 8+ | 60 |
| 9- | 71 |

# Question 1 (AO1): (No Calc) 30% of students got this right (1 marks)

**11**




(*b*) Write down estimates for the roots of $f(x) = 0$

.....

**(1)**

# Question 2 (AO2): (No Calc) 29% of students got this right (3 marks)

**12.** Mark has 18 bags of counters and 12 boxes of counters.

The mean number of counters in all 30 bags and boxes is 14
The mean number of counters in the 18 bags is 10

Mark says

"The mean number of counters per box is 4"

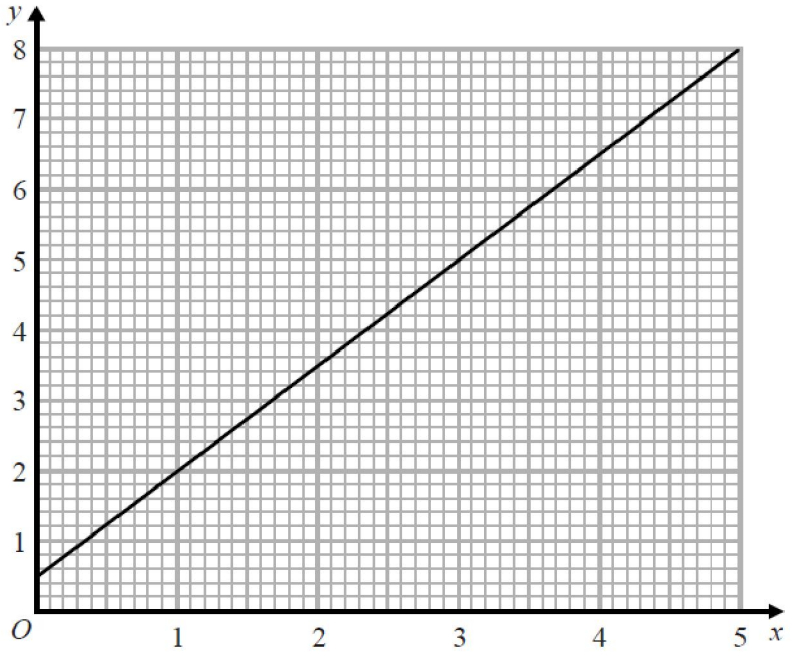
Is Mark right?
You must show how you get your answer.

**(Total for Question 12 is 3 marks)**

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# Question 3 (AO1): 28% of students got this right (3 marks)

**2 b**




Deliveries cost \$ $y$ for $x$ miles.

The graph gives the values of $y$ for values of $x$ from 0 to 5.

(b) Write the equation of the straight line in the form $y = m\,x + c$

.....

**(3)**

# Question 4 (AO3): (No Calc) 28% of students got this right (5 marks)

**9** James and Peter cycled along the same 50 km route.

James took $2\frac{1}{2}$ hours to cycle the 50 km.

Peter started to cycle 5 minutes after James started to cycle.
Peter caught up with James when they had both cycled 15 km.

James and Peter both cycled at constant speeds.

Work out Peter's speed.

..... km/h

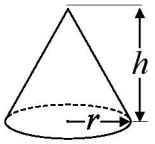
**(Total for Question 9 is 5 marks)**

# Question 5 (AO3): (No Calc) 28% of students got this right (4 marks)

**15** A cone has a volume of 98 $cm^3$.
The radius of the cone is 5.13 cm.

($a$) Work out an estimate for the height of the cone.

Volume of cone = $\frac{1}{3}\pi r^2 h$




.....cm
**(3)**

John uses a calculator to work out the height of the cone to 2 decimal places.

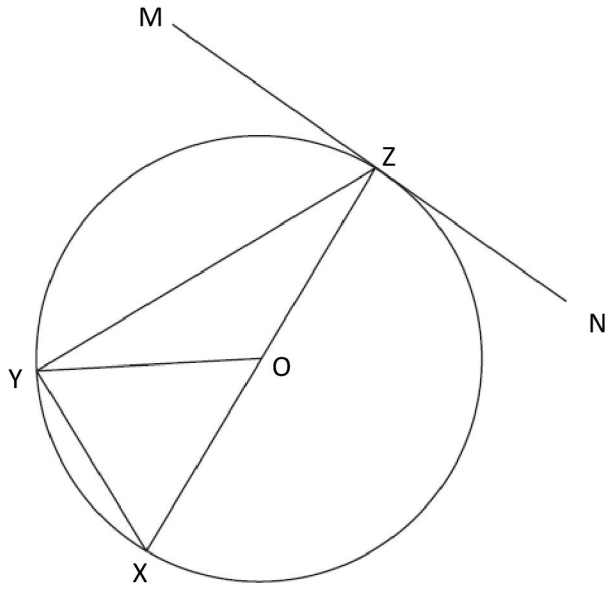
($b$) Will your estimate be more than John's answer or less than John's answer?
Give reasons for your answer.

**(1)**

**(Total for Question 15 is 4 marks)**

# Question 6 (AO3): 28% of students got this right (4 marks)

**17**




*X*, *Y* and *Z* are points on the circumference of a circle centre *O*.

*NZM* is a tangent to the circle.

Angle *YZM* = 54°

Find the size of angle *XOY*.
You must give a reason for each stage of your working.

# Question 7 (AO2): (No Calc) 28% of students got this right (1 marks)

**9** The grouped frequency table gives information about the ages of a different group of people.

| **Age ($a$ years)** | **Frequency** |
|---|---|
| $0 < a \leqslant 20$ | 7 |
| $20 < a \leqslant 30$ | 12 |
| $30 < a \leqslant 40$ | 5 |
| $40 < a \leqslant 50$ | 1 |

Anne drew this cumulative frequency table for this information.

| **Age ($a$ years)** | **Cumulative frequency** |
|---|---|
| $0 < a \leqslant 20$ | 7 |
| $20 < a \leqslant 30$ | 19 |
| $30 < a \leqslant 40$ | 24 |
| $40 < a \leqslant 50$ | 25 |

The cumulative frequency table is **not** correct.

($b$) Write down one thing that is wrong with the table.

# Question 8 (AO1): 26% of students got this right (4 marks)

**16.** Make $t$ the subject of the formula $k = \dfrac{2(t+3)}{t-3}$

.....

**(Total for Question 16 is 4 marks)**

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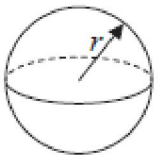
# Question 9 (AO3): 25% of students got this right (4 marks)

**14.** Jan has some metal that she is going to make into solid metal spheres.

Each sphere will have a radius of 2.15 cm.

Jan has 1490 $cm^3$ of metal.

Volume of sphere $= \frac{4}{3}\pi r^3$




(a) Work out an estimate for the number of spheres that Jan can make.

.....

**(3)**

(b) If you calculate the number of spheres accurately, how do you think your answer to part (a) will change?
Give a reason for your answer.

.....

.....

.....

**(1)**

**(Total for Question 14 is 4 marks)**

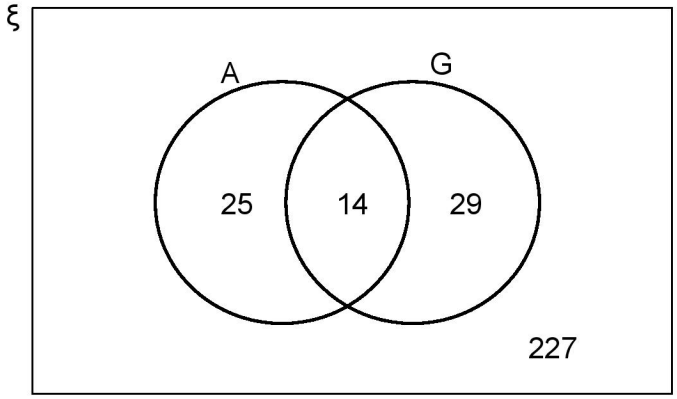
# Question 10 (AO3): 25% of students got this right (5 marks)

**25** In the Venn diagram

ξ = 295 students in a college

A = students who take Art

G = students who take Geography




**25 (a)** One student is chosen at random.
Work out the probability the student takes Art.

**[1 mark]**

Answer _____

**25 (b)** One student who takes Geography is chosen at random.
Work out the probability the student **also** takes Art.

**[1 mark]**

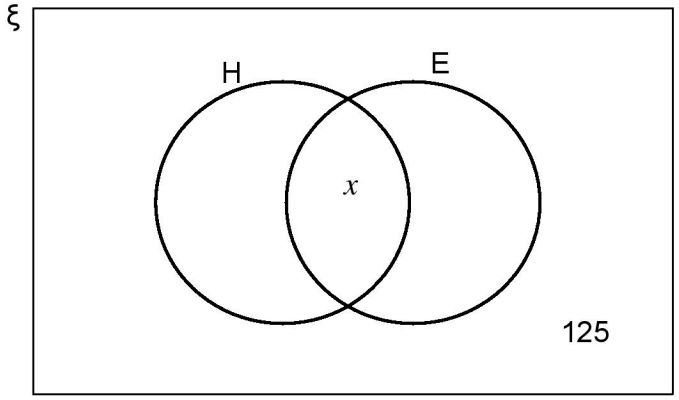
Answer _____

**25 (c)** In this Venn diagram

ξ = 295 students in the college

H = students who take History

E = students who take English




One-half of the students who take History also take English.

The number who take English is twice the number who take History.

Work out the value of $x$.

*Question Order Created by Pinpoint Learnings Automatic Differentiation Algorithmn*

**[3 marks]**

# Question 11 (AO1): (No Calc) 22% of students got this right (3 marks)

**16** $y$ is directly proportional to $\sqrt[3]{x}$

$y = 1\frac{1}{6}$ when $x = 8$

Find the value of $y$ when $x = 64$

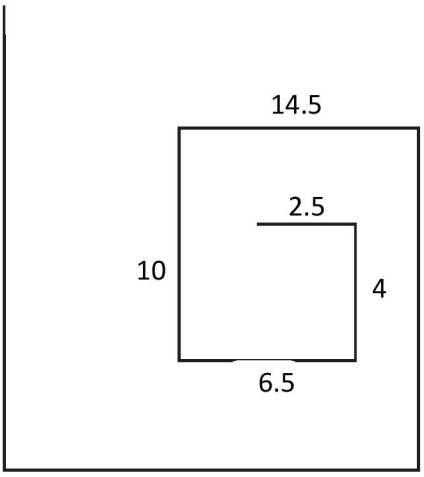
.....

**(Total for Question 16 is 3 marks)**

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# Question 12 (AO1): 22% of students got this right (3 marks)

**18** The diagram shows the first 8 sides of a spiral pattern.
It also gives the lengths, in m, of the first 5 sides.




The lengths, in m, of the sides of the spiral form a sequence.

Find an expression in terms of $n$ for the length, in m, of the $n$th side.

.....

**(Total for Question 18 is 3 marks)**

# Question 13 (AO3): 22% of students got this right (2 marks)

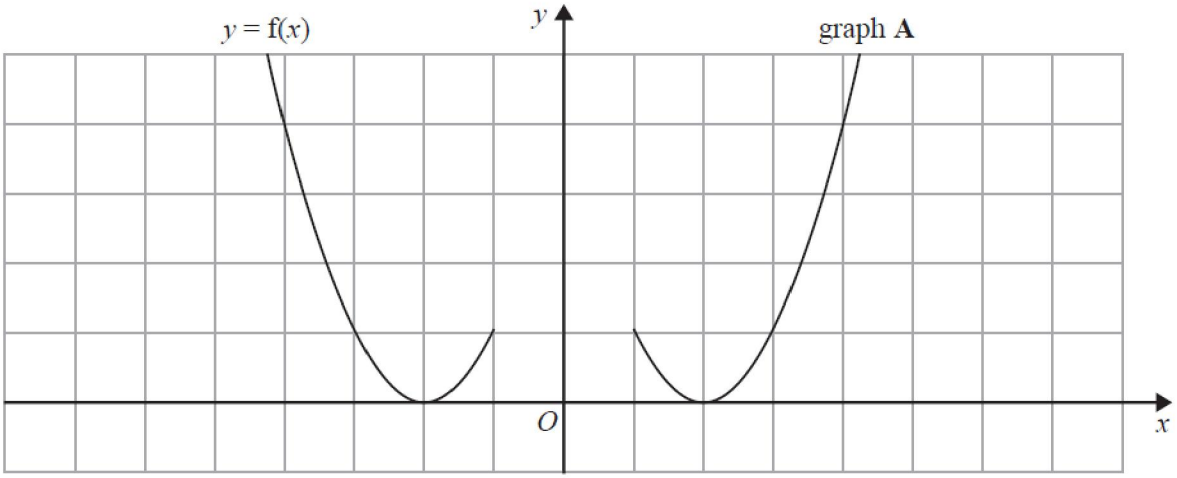
**15.** (a) Find the value of $\sqrt[4]{27\times 3\times 10^{8}}$

.....

**(2)**

# Question 14 (AO3): 19% of students got this right (1 marks)

**22 a** The graph of $y = f(x)$ is shown on the grid.




Graph **A** is a reflection of the graph of $y = f(x)$.

(a) Write down the equation of graph **A**.

.....

**(1)**

# Question 15 (AO1): 19% of students got this right (3 marks)

**14** Write $0.2\dot{3}\dot{1}$ as a fraction in its simplest form.

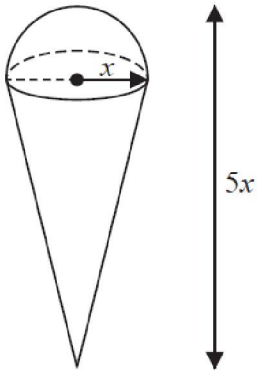
.....

**(Total for Question 14 is 3 marks)**

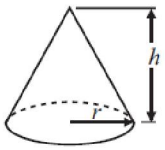
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# Question 16 (AO3): 18% of students got this right (5 marks)

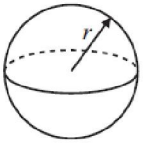
**11** A solid is made by putting a hemisphere on top of a cone.



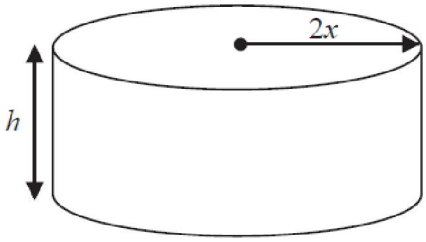

**Volume of cone** $= \frac{1}{3}\pi r^2 h$




**Volume of sphere** $= \frac{4}{3}\pi r^3$




The total height of the solid is $5x$
The radius of the base of the cone is $x$
The radius of the hemisphere is $x$




A cylinder has the same volume as the solid.
The cylinder has radius $2x$ and height $h$
All measurements are in centimetres.

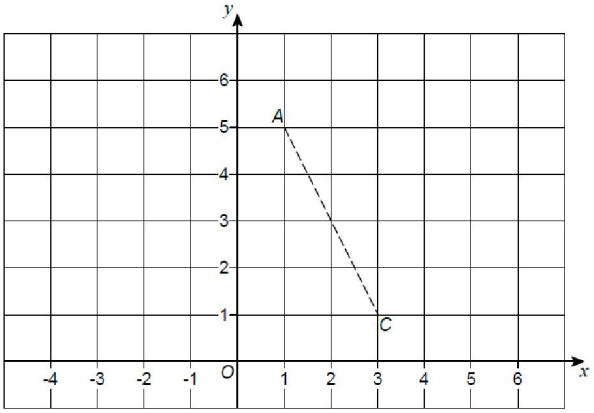
Find a formula for $h$ in terms of $x$
Give your answer in its simplest form.

# Question 17 (AO2): 18% of students got this right (4 marks)

**13 (a)** *AC* is a diagonal of kite *ABCD*.

*A* is the point (1, 5)

*C* is the point (3, 1)




The diagonals of the kite intersect at *M*, the midpoint of *AC*.

$AM = BM$

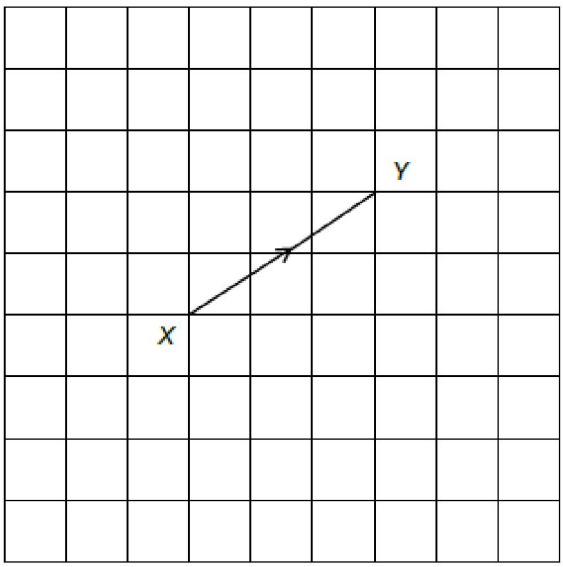
$BM : MD = 1 : 2$

Work out possible coordinates of *B* and *D*. **[2 marks]**

*B* ( _____ , _____ ) and *D* ( _____ , _____ )

**13 (b)**

$\overrightarrow{XY}$ is the vector $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$ on this square grid.

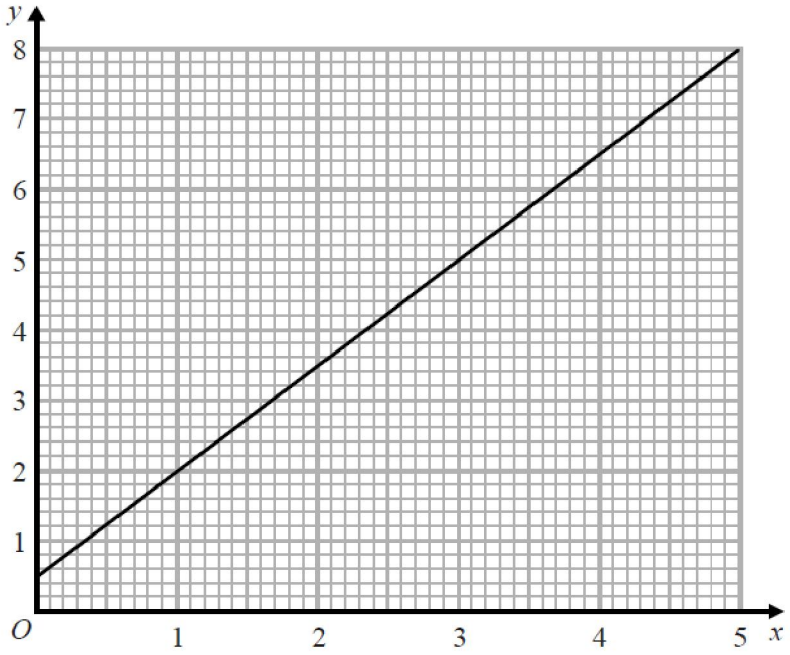



Write down a vector that is

the same size as $\overrightarrow{XY}$

# Question 18 (AO3): 18% of students got this right (1 marks)

**2 ai**




Deliveries cost \$ $y$ for $x$ miles.

The graph gives the values of $y$ for values of $x$ from 0 to 5.

(a) (i) Give an interpretation of the intercept of the graph on the $y$-axis.

.....

.....

.....

**(1 mark)**

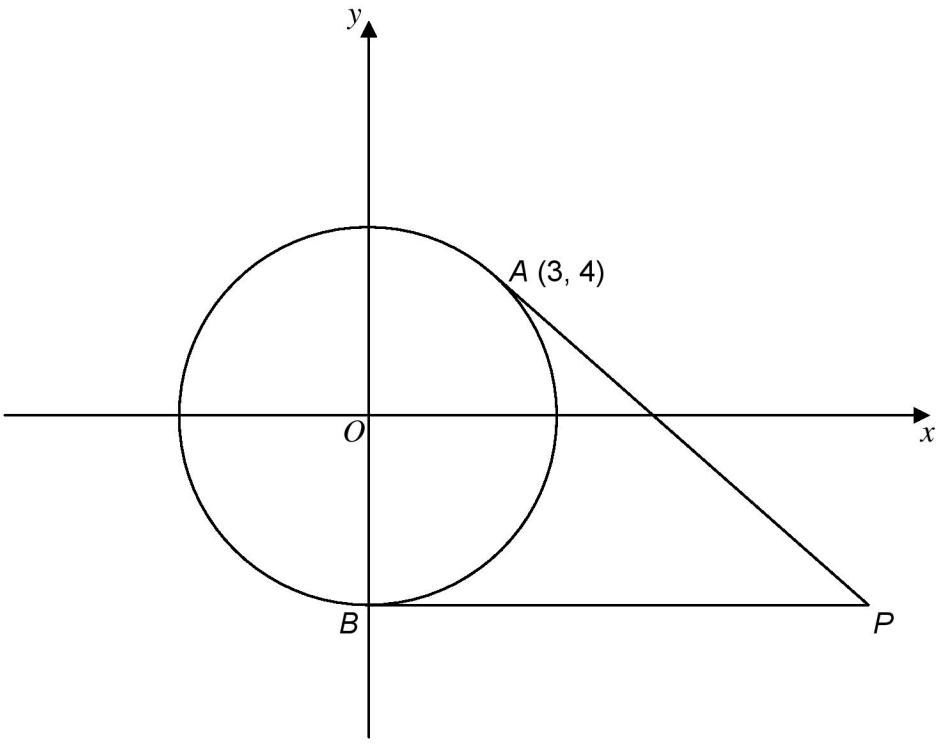
# Question 19 (AO3): 16% of students got this right (6 marks)

**26** *A* and *B* are points on the circle with equation $x^2 + y^2 = 25$

*A* is (3, 4)

*B* is a point on the $y$-axis.

*PA* and *PB* are tangents.




**26 (a)** Show that the coordinates of *B* are (0, 5)

**[1 mark]**

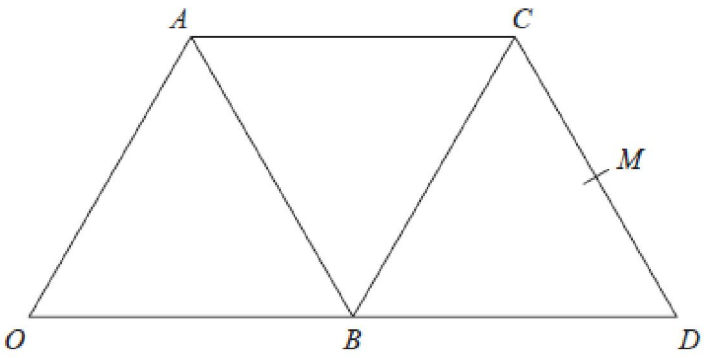
**26 (b)** Give a reason why *PA* = *PB*

**[1 mark]**

**26 (c)** *P* is the point $(a, b)$
Work out the values of $a$ and $b$. **[4 marks]**

# Question 20 (AO3): 13% of students got this right (3 marks)

**20.**




*OACD* is a trapezium and *OACB* is a parallelogram.
*B* is the midpoint of *OD*.
*M* is the midpoint of *CD*.

$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$

Given that $\overrightarrow{BM} = k \times \overrightarrow{OC}$ where $k$ is a scalar,

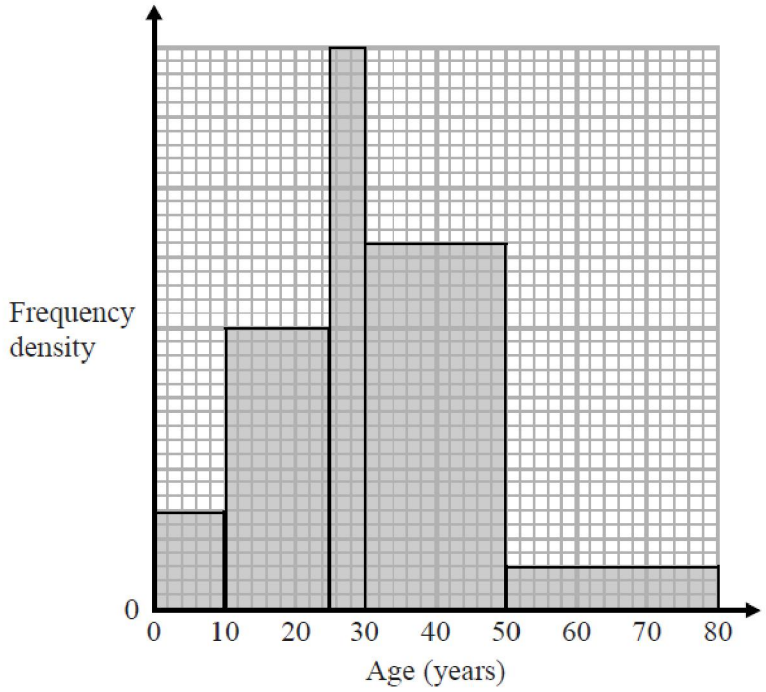
use a vector method to find the value of $k$.

.....

**(Total for Question 20 is 3 marks)**

# Question 21 (AO2): 13% of students got this right (3 marks)

**23** The histogram shows information about the ages of bottles of whiskey at a distillery.




There are 40 bottles aged between 25 and 30

One bottle is chosen at random.

What is the probability that this bottle is less than 30 years old?

.....

**(Total for Question 23 is 3 marks)**

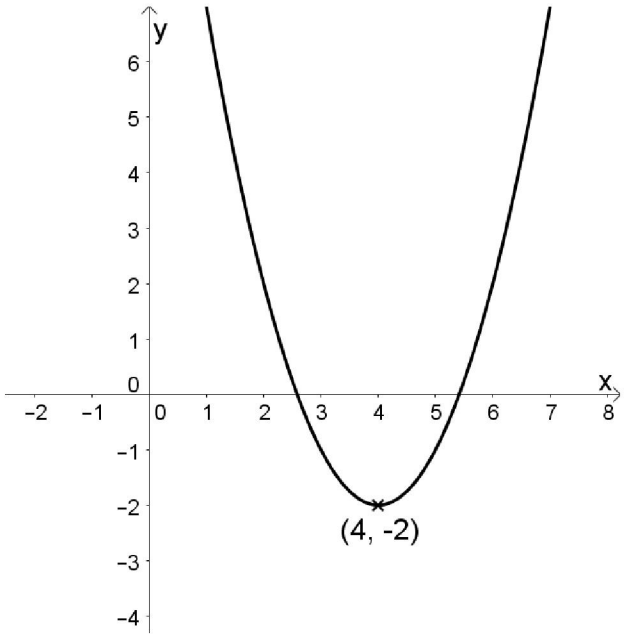
# Question 22 (AO2): (No Calc) 12% of students got this right (3 marks)

**17** $x^2 - 9y^2 = 0$ where $x > 0$ and $y > 0$

(*a*) Work out the ratio $x : y$

# Ext Qn1 (AO1): (No Calc) Only 8% of students got this right( 4 marks

**24.**




A part of the curve with equation $y = f(x)$ is shown in the diagram.
The minimum of the curve is (4,-2).

(*a*) Determine the coordinates of the minimum of the following curves

(i) $y = 2f(x)$

(..... , .....)

(ii) $y = f(3x)$

(..... , .....)

(iii) $y = f(x - 3)$

(..... , .....)

**(3)**

The original curve $y=f(x)$ has been transformed to the curve $y=f(x) + 2$

(*b*) Which transformation has been applied to the original curve?

.....

**(1)**

**(Total 4 marks)**

# Ext Qn2 (AO2): (No Calc) Only 8% of students got this right( 4 marks

**25.**

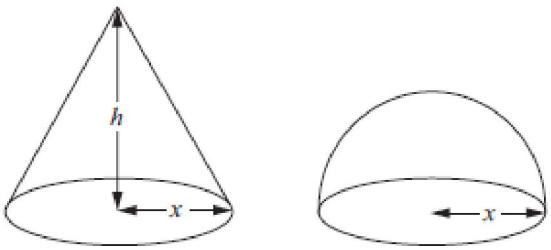



Diagram **NOT** accurately drawn

The diagram shows a solid cone and a solid hemisphere.

The cone has a base of radius $x$ cm and a height of $h$ cm.
The hemisphere has a base of radius $x$ cm.
The surface area of the cone is equal to the surface area of the hemisphere.

Find an expression for $h$ in terms of $x$.

.....

**(Total 4 marks)**

# Ext Qn3 (AO1): Only 8% of students got this right( 5 marks)

**22** The line $l$ is a tangent to the circle $x^2 + y^2 = 40$ at the point $A$.
$A$ is the point (2, 6).

The line $l$ crosses the $x$-axis at the point $P$.

Work out the area of triangle $OAP$.

# Answers to Qn 1 (AO1): (No Calc) 30% of students got this right

**Question 11 (Total 3 marks)**

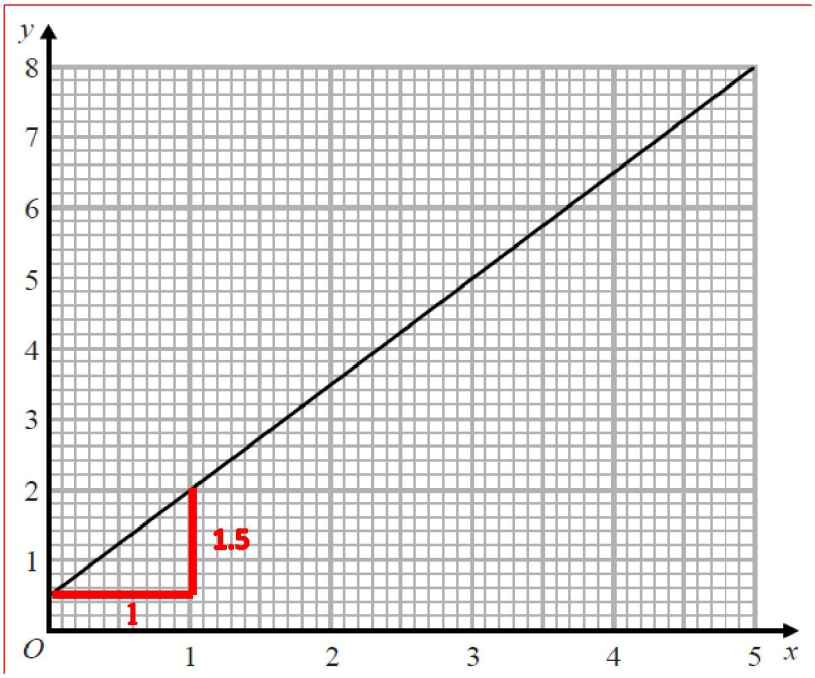
| Part | Working an or answer examiner might expect to see | Mark | Notes |
|---|---|---|---|
| (b) | 2.75, −0.75 | B1 | This mark is given for the correct answers only |

# Answers to Qn 2 (AO2): (No Calc) 29% of students got this right

| | | | | |
|---|---|---|---|---|
| 12 | | No | C1 | for showing method to find total of all (30×14 or 420) or for bags (18×10 or 180) or using Mark's result $18\times10 + 12 \times 4$ |
| | | (supported) | C1 | (dep C1) or showing method to find total for boxes, e.g. "420" – "180" (=240) or both totals using Mark's mean eg. $18\times10 + 12 \times 4$ and $30 \times 14$ |
| | | | C1 | for showing complete solution, e.g. leading to $240 \div 12$ and 20, or 420 and $180 + 48 = 228$ |

# Answers to Qn 3 (AO1): 28% of students got this right

**2 b**




Deliveries cost \$ $y$ for $x$ miles.

The graph gives the values of $y$ for values of $x$ from 0 to 5.

(b) Write the equation of the straight line in the form $y = mx + c$

Gradient: $m = \frac{change\ in\ y}{change\ in\ x} = \frac{1.5}{1} = 1.5$

Equation: $y = 1.5x + 0.5$

.....

**(3)**

# Answers to Qn 4 (AO3): (No Calc) 28% of students got this right

**Question 9 (Total 5 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| | 50 ÷ 2.5 = 20 | 1 | This mark is given for finding James' speed |
| | 15 ÷ 20 = 0.75 hrs = 45 mins | 1 | This mark is given for finding James' time for 15 km |
| | 45 – 40 = 40 mins | 1 | This mark is given for finding Peter's time for 15 km |
| | 15 ÷ 0.6666…. | 1 | This mark is given for finding Peter's speed |
| | 22.5 | 1 | This mark is given for the correct answer only |

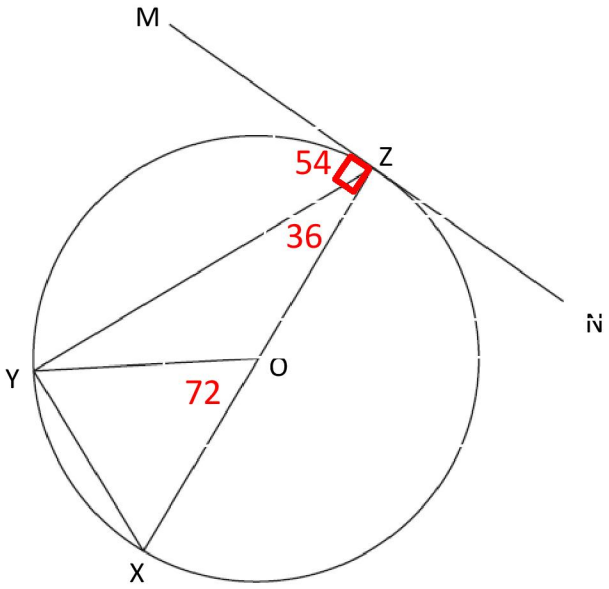
# Answers to Qn 5 (AO3): (No Calc) 28% of students got this right

**Question 15 (Total 4 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| (a) | $100 \approx \frac{1}{3} \times 3 \times 25h$ | M1 | This mark is given for substitution of suitable terms into the formula for the volume of a cone |
| | $h \approx \frac{100}{25}$ | M1 | This mark is given for a method to rearrange and solve |
| | $h \approx 4$ | A1 | This mark is given for a correct single value from estimate (accept answers in the range 3.5 to 4.5) |
| (b) | More since the number in the numerator goes up; the numbers in the denominator go down. | C1 | This communication mark is given for a correct comment |

# Answers to Qn 6 (AO3): 28% of students got this right

**17**




*X*, *Y* and *Z* are points on the circumference of a circle centre *O*.

*NZM* is a tangent to the circle.

Angle *YZM* = 54°

Find the size of angle *XOY*.
You must give a reason for each stage of your working.

Diameter intersects tangent at 90°
So YZO $= 90 - 54 = 36°$

Angle subtended to center double that at circumference
So $XOY = 2 \times 36 = 72°$

**(Total for Question 17 is 4 marks)**

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# Answers to Qn 7 (AO2): (No Calc) 28% of students got this right

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| 9 (b) | | Incorrect classes | C1 | for identifying that the class intervals are incorrect, e.g. should be $0 < a \leq 30, 40, 50$ |

# Answers to Qn 8 (AO1): 26% of students got this right

| | | | | |
|---|---|---|---|---|
| 16 | | $t = \frac{6+3k}{k-2}$ | M1<br>M1<br>M1<br>A1 | intention to multiply both sides by $t-3$ as the first step<br>isolate terms in $t$ ie by moving $t$ terms to one side of the equation, and everything else to the other side<br>factorise for $t$ (dep on having an expression that can factorise for $t$).<br>Oe |

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

| | | | | | |
|---|---|---|---|---|---|
| 14 | (a) | | 46 to 50 | P1 | for start to process e.g. evidence of using volume, e.g. $1490 \div \frac{4}{3}\pi r^3$ oe or use of estimates |
| | | | | P1 | complete process , e.g. number = $\frac{3\times1500}{4\times3\times2^3}$ |
| | | | | A1 | arrives at estimate, e.g. 46 to 50 |
| | (b) | | would be less | C1 | e.g. most divisors have been made smaller |

# Answers to Qn 10 (AO3): 25% of students got this right

| Q | Answer | Mark | Comments |
|---|---|---|---|
| 25(a) | 39<br>295 | B1 | |
| | **Additional Guidance** | | |
| | | | |
| 25(b) | 14<br>43 | B1 | |
| | **Additional Guidance** | | |
| | | | |
| 25(c) | $x$ in History only<br>(and $3x$ in English only)<br>or<br>expressions inside circles such that the number who take English is twice the number who take History | M1 | |
| | $x$ + their $x$ + their $3x$ + 125 = 295 | M1 | oe equation<br>Must have three expressions inside circles |
| | 34 | A1 | |
| | **Additional Guidance** | | |
| | $2x$ in History only and $5x$ in English only | | M1 |

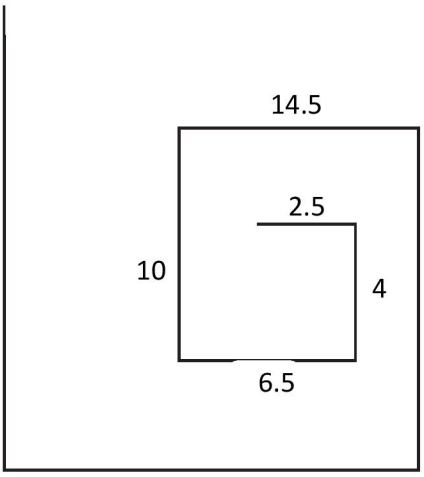
# Answers to Qn 11 (AO1): (No Calc) 22% of students got this right

**Question 16 (Total 2 marks)**

| Part | Working or answer an examiner might expect to see | Mark | Notes |
|---|---|---|---|
| | $y = k\sqrt[3]{x}$<br>$\frac{7}{6} = 2k$<br>$k = \frac{7}{12}$ | 1 | This mark is given for substituting to find a value for $k$ |
| | $y = \frac{7}{12} \times 4$ | 1 | This mark is given for finding an expression for $y$ when $x = 64$ |
| | $y = 2\frac{1}{3}$ | 1 | This mark is given for the correct answer only |

# Answers to Qn 12 (AO1): 22% of students got this right

**18** The diagram shows the first 8 sides of a spiral pattern.
It also gives the lengths, in m, of the first 5 sides.




The lengths, in m, of the sides of the spiral form a sequence.

Find an expression in terms of $n$ for the length, in m, of the $n$th side.

| | | | | |
|---|---|---|---|---|
| | 2.5 | 4 | 6.5 | 10 |
| 1st difference: | 1.5 | 2.5 | 3.5 | |
| 2nd difference: | | 1 | 1 | So includes $\frac{1}{2}n^2$ |

| | | | | |
|---|---|---|---|---|
| | 2.5 | 4 | 6.5 | 10 |
| $\frac{1}{2}n^2$: | 0.5 | 2 | 4.5 | 8 |
| Difference: | 2 | 2 | 2 | 2 |

So nth term is $\frac{1}{2}n^2 + 2$

.....

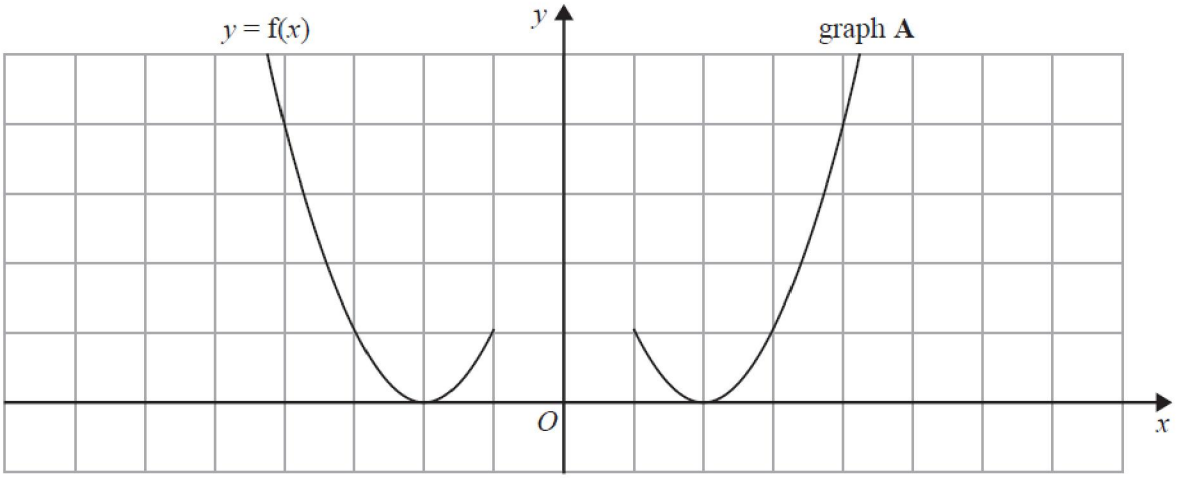
**(Total for Question 18 is 3 marks)**

# Answers to Qn 13 (AO3): 22% of students got this right

| | | | | | |
|---|---|---|---|---|---|
| 15 | (a) | | 300 | B1 | for correct use of indices rules, e.g. sight of 3 from $\sqrt[4]{27\times3}$ or sight of $10^2$ |
| | | | | B1 | for 300, $3\times10^2$ oe |

# Answers to Qn 14 (AO3): 19% of students got this right

**22 a** The graph of $y = f(x)$ is shown on the grid.




Graph **A** is a reflection of the graph of $y = f(x)$.

(a) Write down the equation of graph **A**.

Reflection in $y$-axis: $y = f(-x)$

.....

**(1)**

# Answers to Qn 15 (AO1): 19% of students got this right

**14** Write $0.2\dot{3}\dot{1}$ as a fraction in its simplest form.

$x = 0.2313131\ldots$

$100x = 23.1\mathbf{31313131}\ldots$

$-x = \ \ 0.2\mathbf{31313131}\ldots$

$99x = 22.9$

$990x - 229$

So $0.2\dot{3}\dot{1} = x = \frac{229}{990}$

..... $\frac{229}{990}$ .....

**(Total for Question 14 is 3 marks)**

---

# Answers to Qn 16 (AO3): 18% of students got this right

| Paper 1MA1: 1H | | | |
|---|---|---|---|
| **Question** | **Working** | **Answer** | **Notes** |
| 11 | $\frac{4}{3\times2}\pi x^3+\frac{4}{3}$<br>$\pi x^3=2\pi x^3$<br><br>$(2x)^2\pi h = 4x^2\pi h$<br>$4x^2\pi h = 2\pi x^3$ | $h=\frac{x}{2}$ | P1 Process to find volume of cone or hemisphere<br>P1 Process to total volume of solid<br>P1 Process to find volume of cylinder<br>P1 Equates 2 volumes<br>A1 Reaches $h=\frac{x}{2}$ |

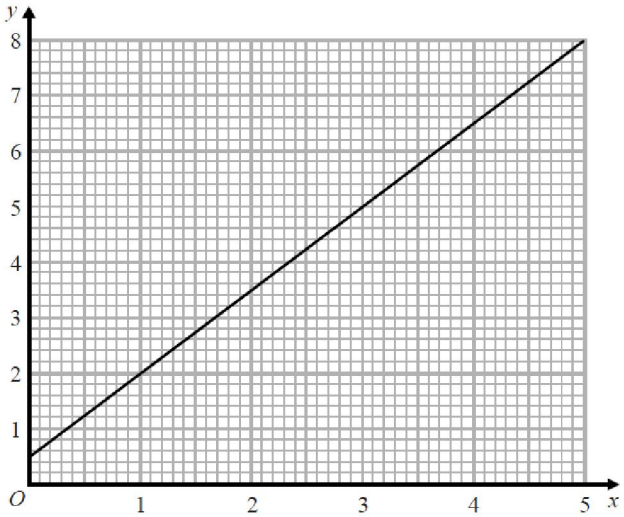
# Answers to Qn 17 (AO2): 18% of students got this right

| | | | |
|---|---|---|---|
| **13(a)** | *B* (0, 2) and *D* (6, 5)<br>or<br>*B* (4, 4) and *D* (–2, 1) | B2 | B1 for one correct<br>or for one correct and one incorrect<br>or *B* and *D* reversed<br>or correct diagonal drawn of any length |
| | **Additional Guidance** | | |
| | eg *B*(0,2) and *D*(2, 1) | | B1 |

| | | | |
|---|---|---|---|
| **13(b)** | $\begin{matrix}2\\-3\end{matrix}$ or $\begin{matrix}-2\\3\end{matrix}$ | B2 | B1 for vector of same size<br>or for any perpendicular vector |
| | **Additional Guidance** | | |
| | | | |

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

**2 ai**




Deliveries cost \$ $y$ for $x$ miles.

The graph gives the values of $y$ for values of $x$ from 0 to 5.

(a) (i) Give an interpretation of the intercept of the graph on the $y$-axis.

the y intercept represents the fixed charge for a delivery

# Answers to Qn 19 (AO3): 16% of students got this right

| | | | |
|---|---|---|---|
| **26(a)** | $0^2 + (-5)^2 = 25$<br>or<br>$(0^2 +) y^2 = 25$ and $y = -5$<br>or<br>radius of the circle is 5 | B1 | oe |
| | **Additional Guidance** | | |
| | *B* is on the $y$-axis | | B0 |
| | *B* is below the Origin | | B0 |

| | | | |
|---|---|---|---|
| **26(b)** | Tangents from an external point are equal in length | B1 | |
| | **Additional Guidance** | | |
| | | | |

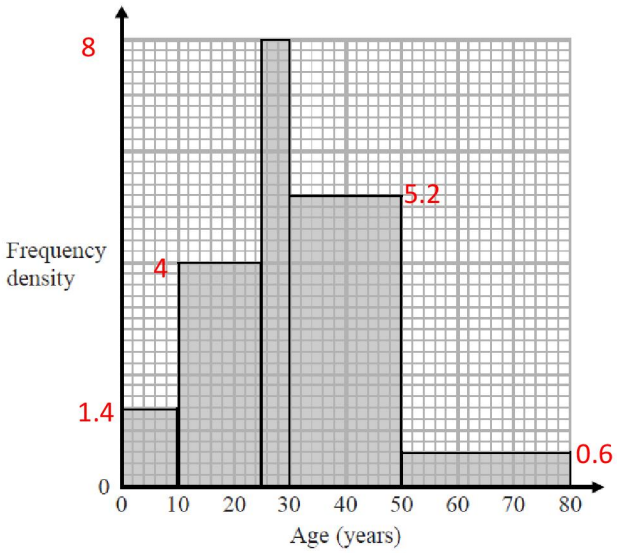
| | | | |
|---|---|---|---|
| **26(c)** | **Alternative method 1** | | |
| | $(a - 3)^2 + (-5 - 4)^2 = a^2$ | M1 | oe<br>$PA^2 = PB^2$ |
| | $a^2 - 3a - 3a + 9 + 81 = a^2$ | M1 | Expands brackets<br>Allow one error |
| | $6a = 90$ | M1 | Rearranges their quadratic equation to $ka = c$ |
| | $(a =)$ 15 and $(b =) -5$ | A1 | SC1 $b = -5$ |
| | **Alternative method 2** | | |
| | (grad *AP* =) $-1 \div \frac{4}{3}$ or $-\frac{3}{4}$ | M1 | |
| | $y - 4 = -\frac{3}{4}(x - 3)$<br>or<br>$y = -\frac{3}{4}x + c$ and substitutes (3, 4) | M1 | oe eg $y = -\frac{3}{4}x + \frac{25}{4}$<br>ft their gradient *AP* |
| | $-5 = -\frac{3}{4}x + \frac{25}{4}$ | M1 | oe<br>ft their equation *AP* |
| | $(a =)$ 15 and $(b =) -5$ | A1 | SC1 $b = -5$ |
| | **Mark scheme for 26(c) continues on the next page** | | |

# Answers to Qn 20 (AO3): 13% of students got this right

| | | | | |
|---|---|---|---|---|
| 20 | | 0.5 | M1 | writes $\overrightarrow{CD}$ as $-\mathbf{a}+\mathbf{b}$ or $\overrightarrow{MD}$ as $\frac{1}{2}(-\mathbf{a}+\mathbf{b})$ oe |
| | | | M1 | writes $\overrightarrow{BM}$ as $\overrightarrow{BD}+\overrightarrow{DM}$ or $\mathbf{b}-\frac{1}{2}$ ("$-\mathbf{a}+\mathbf{b}$") or $\overrightarrow{BC}+\overrightarrow{CM}$ or $\mathbf{a}+\frac{1}{2}$ ("$-\mathbf{a}+\mathbf{b}$") where "$-\mathbf{a}+\mathbf{b}$" is ft their expression for $\overrightarrow{CD}$ or $2\times\overrightarrow{MD}$ |
| | | | A1 | For stating $k$ as 0.5, and supported by a vector method |

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

**23** The histogram shows information about the ages of bottles of whiskey at a distillery.




There are 40 bottles aged between 25 and 30

One bottle is chosen at random.

What is the probability that this bottle is less than 30 years old?

25-30: Frequency density $= \frac{frequency}{class\ sidth} = \frac{\mathbf{40}}{5} = 8$

10-25: class width $= 25 - 10 = 15$

frequency $= 4 \times 15 = \mathbf{60}$

0-10: class width $= 10$

frequency $= 1.4 \times 10 = \mathbf{14}$

number of bottles under 30 $= 40 + 60 + 10 = 110$

30-80: frequency $= 5.2 \times 20 + 0.6 \times 30 = 104 + 180 = \mathbf{284}$

Total number of bottles $= 394$

$p(< 30) = \frac{284}{394} = \frac{142}{197}$

.....

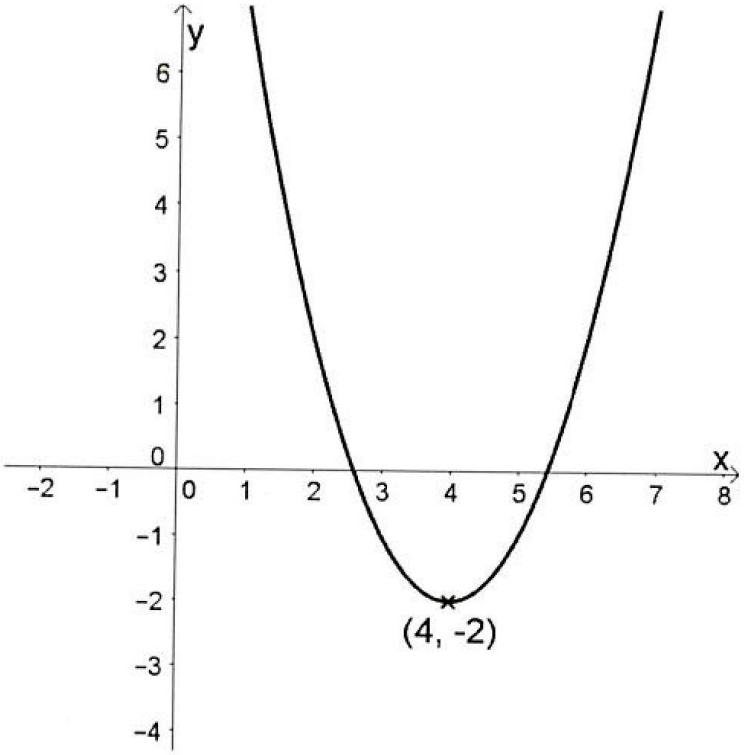
**(Total for Question 23 is 3 marks)**

# Answers to Qn 22 (AO2): (No Calc) 12% of students got this right

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| 17 (a) | | 3 : 1 | M1 | for $(x \pm 3y)(x \pm 3y)$ or $\frac{x^2}{y^2} = 9$ |
| | | | A1 | for $x = 3y$ or $\frac{x}{y} = 3$ |
| | | | A1 | for 3 : 1 oe |

# Ext ANSWERS 1 (AO1): (No Calc) Only 8% of students got this right

**24.**




A part of the curve with equation $y = f(x)$ is shown in the diagram.
The minimum of the curve is (4,-2).

(*a*) Determine the coordinates of the minimum of the following curves

(i) $y = 2f(x)$

(4 , -4)

(ii) $y = f(3x)$

(4/3 , -2)

(iii) $y = f(x - 3)$

(7 , -2)

**(3)**

The original curve $y=f(x)$ has been transformed to the curve $y=f(x) + 2$

Question Order Created by Pinpoint Learnings Automatic Differentiation Algorithmn

(*b*) Which transformation has been applied to the original curve?

# Ext ANSWERS 2 (AO2): (No Calc) Only 8% of students got this right

**25.**

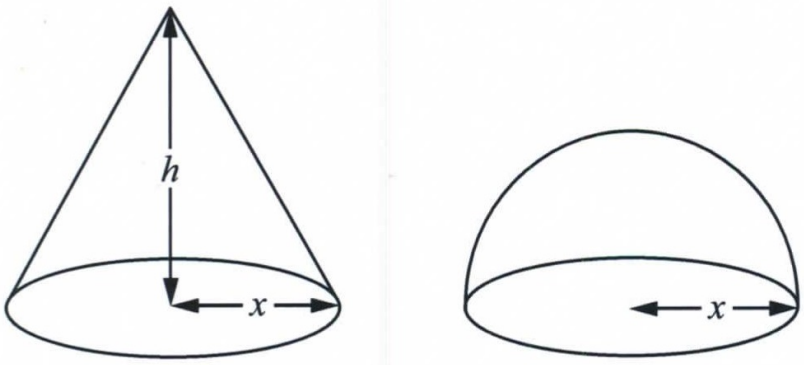



Diagram **NOT** accurately drawn

The diagram shows a solid cone and a solid hemisphere.

The cone has a base of radius $x$ cm and a height of $h$ cm.
The hemisphere has a base of radius $x$ cm.
The surface area of the cone is equal to the surface area of the hemisphere.

Find an expression for $h$ in terms of $x$.

$$SA_{cone} = \pi x l + \pi x^2$$

$$SA_{hemisphere} = \frac{4\pi x^2}{2} + \pi x^2$$

$$= 2\pi x^2 + \pi x^2$$

$$\pi x l + \pi x^2 = 2\pi x^2 + \pi x^2$$

$$\pi x l = 2\pi x^2$$

$$l = 2x$$

$$\sqrt{h^2 + x^2} = 2x$$

# Ext ANSWERS 3 (AO1): Only 8% of students got this right( 5 marks)

| Paper 1MA1: 1H | | | |
|---|---|---|---|
| **Question** | **Working** | **Answer** | **Notes** |
| 22 | | 60 | P1 process to start problem eg draw diagram and find gradient of $OA$ (= 3)<br>P1 process to find equation of tangent with $m = -1/'3'$<br>P1 process to find $x$-axis intercept of tangent<br>P1 process to find area of triangle<br>A1 cao |