GradeMax

Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel International GCSE

Centre Number | Candidate Number

Monday 7 January 2019

Morning (Time: 2 hours) | Paper Reference **4MA0/3HR**

Mathematics A

Paper 3HR
Higher Tier



You must have:
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
  Anything you write on the formulae page will gain NO credit.

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

Turn over ▶

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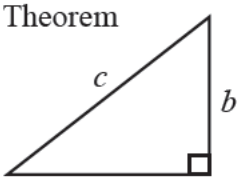
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International GCSE MATHEMATICS
FORMULAE SHEET – HIGHER TIER

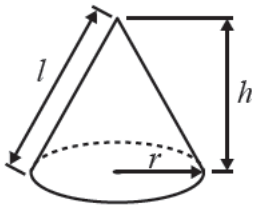
Pythagoras' Theorem



$a^2 + b^2 = c^2$

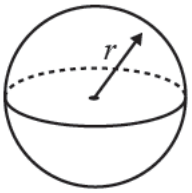
Volume of cone = $\frac{1}{3}\pi r^2 h$

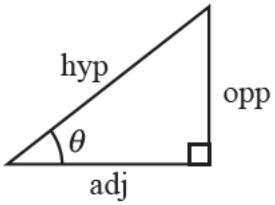
Curved surface area of cone = $\pi r l$



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

Surface area of sphere = $4\pi r^2$





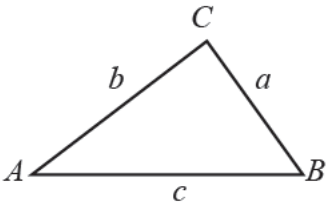
adj = hyp × cos θ
opp = hyp × sin θ
opp = adj × tan θ

or $\sin\theta = \frac{\text{opp}}{\text{hyp}}$

$\cos\theta = \frac{\text{adj}}{\text{hyp}}$

$\tan\theta = \frac{\text{opp}}{\text{adj}}$

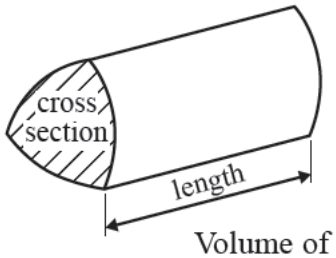
In any triangle ABC



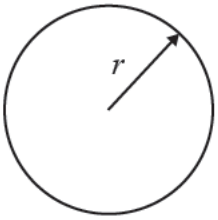
Sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine rule: $a^2 = b^2 + c^2 - 2bc\cos A$

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



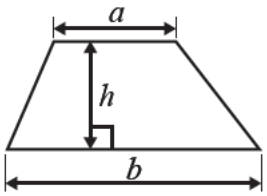
Volume of prism = area of cross section × length

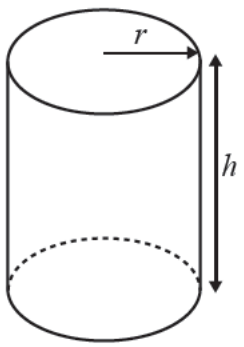


Circumference of circle = $2\pi r$

Area of circle = πr^2

Area of a trapezium = $\frac{1}{2}(a+b)h$





Volume of cylinder = $\pi r^2 h$

Curved surface area of cylinder = $2\pi r h$

The Quadratic Equation
The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

P 5 5 9 4 5 A 0 2 2 4

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Answer ALL TWENTY TWO questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Pierre's weekly pay is 560 euros.
He gets a pay increase of 7%

(a) Work out Pierre's weekly pay after the increase.

euros

(3)

Lucienne also gets a pay increase of 7%
Her weekly pay increases by 42 euros.

(b) Work out Lucienne's weekly pay before the increase.

euros

(3)

(Total for Question 1 is 6 marks)

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2 The diagram shows two circles, each of diameter 30 cm, inside a rectangle.

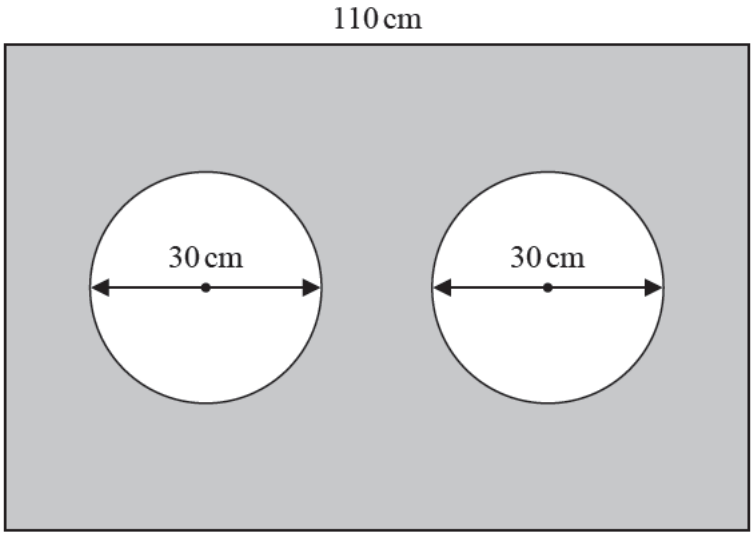


Diagram **NOT** accurately drawn

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

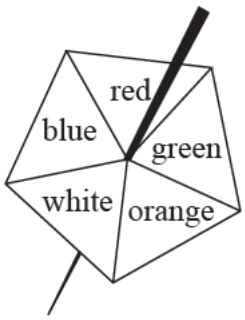
cm^2

(Total for Question 2 is 4 marks)

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3 Here is a biased five-sided spinner.



When the spinner is spun the probabilities that it lands on blue, red, green and orange are given in the table.

Colour	blue	red	green	orange	white
Probability	0.17	0.1	0.13	0.15	

Gary spins the spinner once.

(a) Work out the probability that the spinner lands on white.

(2)

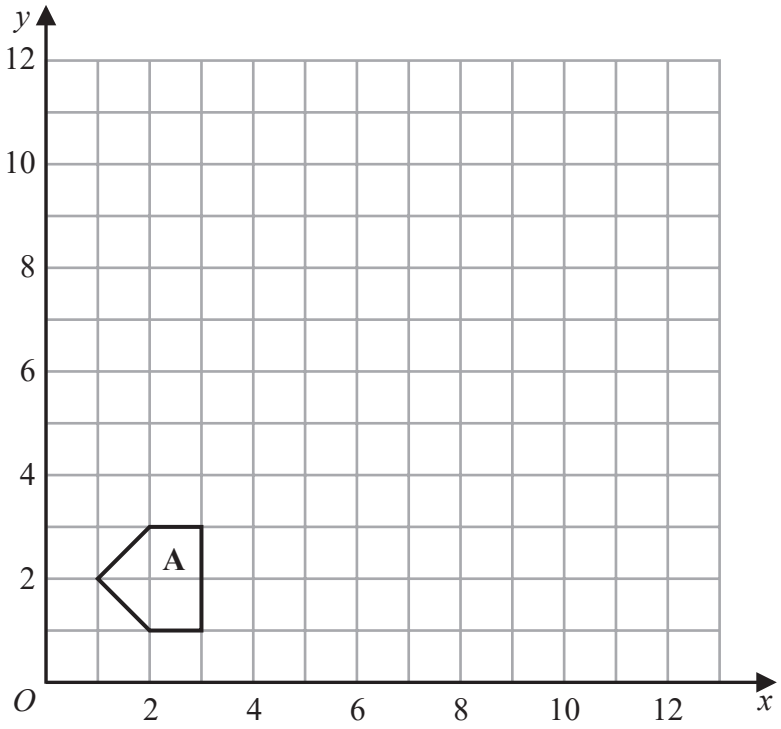
Jasmine is going to spin the spinner 360 times.

(b) Work out an estimate for the number of times the spinner will land on red.

(2)

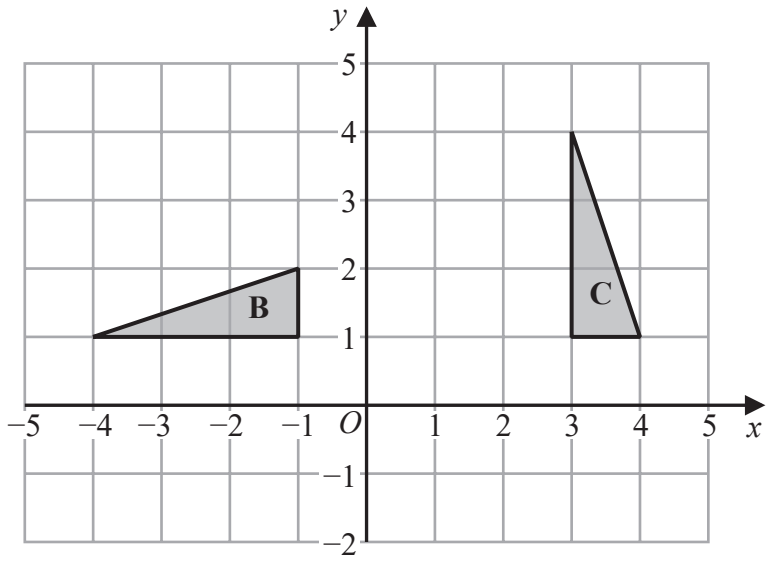
(Total for Question 3 is 4 marks)

4



(a) On the grid, enlarge shape **A** with scale factor 3 and centre *O*.

(2)



(b) Describe fully the single transformation that maps triangle **B** onto triangle **C**.

(3)

(Total for Question 4 is 5 marks)

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5 Express 630 as a product of its prime factors.
Show your working clearly.

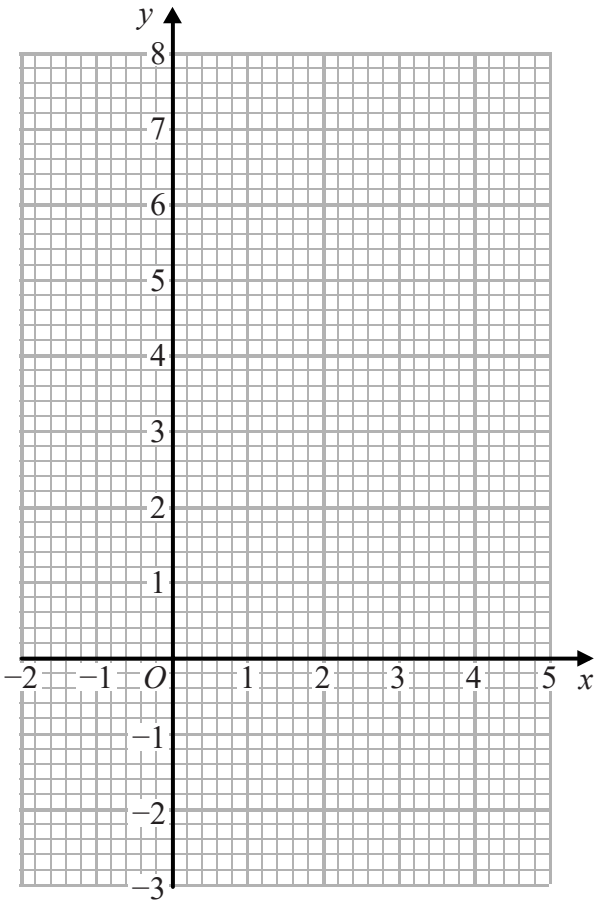
(Total for Question 5 is 2 marks)

6 (a) Complete the table of values for $y = x^2 - 2x - 1$

x	−1	0	1	2	3	4
y			−2	−1		

(2)

(b) On the grid, draw the graph of $y = x^2 - 2x - 1$ for values of x from −1 to 4



(2)

(c) Use your graph to find estimates for the solutions of the equation $x^2 - 2x - 1 = 1$

(2)

(Total for Question 6 is 6 marks)

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7 Here is a pentagon.

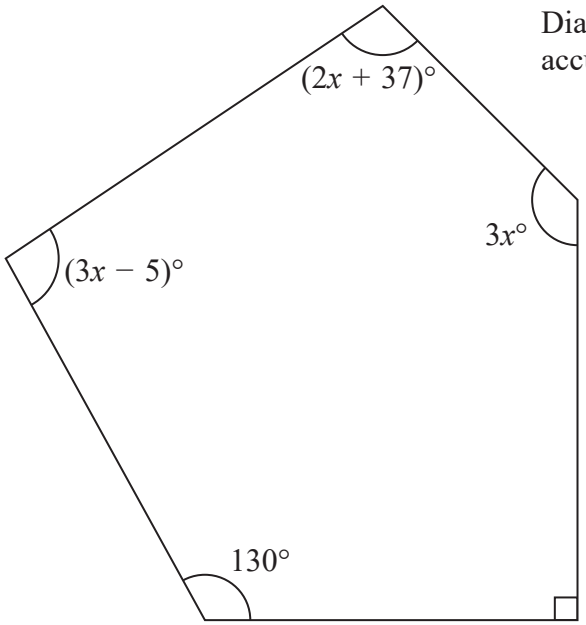


Diagram **NOT** accurately drawn

Work out the value of x.

$x =$

(Total for Question 7 is 3 marks)

8 Ben, Carlos and Delanna share \$760 in the ratios 2 : 3 : 5

Ben gives half of his share to charity.

Carlos gives $\frac{2}{3}$ of his share to charity.

Delanna gives 30% of her share to charity.

Work out how much of the \$760 is given to charity.

\$

(Total for Question 8 is 5 marks)

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9 (a) Simplify $c^{12} \div c^4$

(1)

(b) Simplify $5y \div y$

(1)

(c) Expand and simplify $4(2x - 3y) - 2(3x + y)$

(2)

(Total for Question 9 is 4 marks)

10 The straight line **L** passes through the point with coordinates $(6, -4)$ and is parallel to the straight line with equation $y = 5 - 3x$

Find an equation for **L**.

(Total for Question 10 is 3 marks)

11 (a) Write 0.000 000 54 in standard form.

(1)

The population of Sweden is 9.92×10^6
The population of Denmark is 57.6% of the population of Sweden.

(b) Work out the population of Denmark.
Give your answer in standard form correct to 2 significant figures.

(2)

The population of China is 1.4×10^9
The population of Hong Kong is 7.4×10^6

The population of China is k times the population of Hong Kong.

(c) Calculate the value of k.
Give your answer correct to the nearest whole number.

$k =$

(2)

(Total for Question 11 is 5 marks)

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12 Solve the simultaneous equations

$$3x + 2y = 5.5$$

$$5x - 3y = -13$$

Show clear algebraic working.

$x =$

$y =$

(Total for Question 12 is 4 marks)

13 The table shows information about the marks gained by 200 students in a music examination.

Mark (m)	Frequency
$0 < m \leqslant 20$	15
$20 < m \leqslant 40$	25
$40 < m \leqslant 60$	80
$60 < m \leqslant 80$	50
$80 < m \leqslant 100$	20
$100 < m \leqslant 120$	10

(a) Complete the cumulative frequency table.

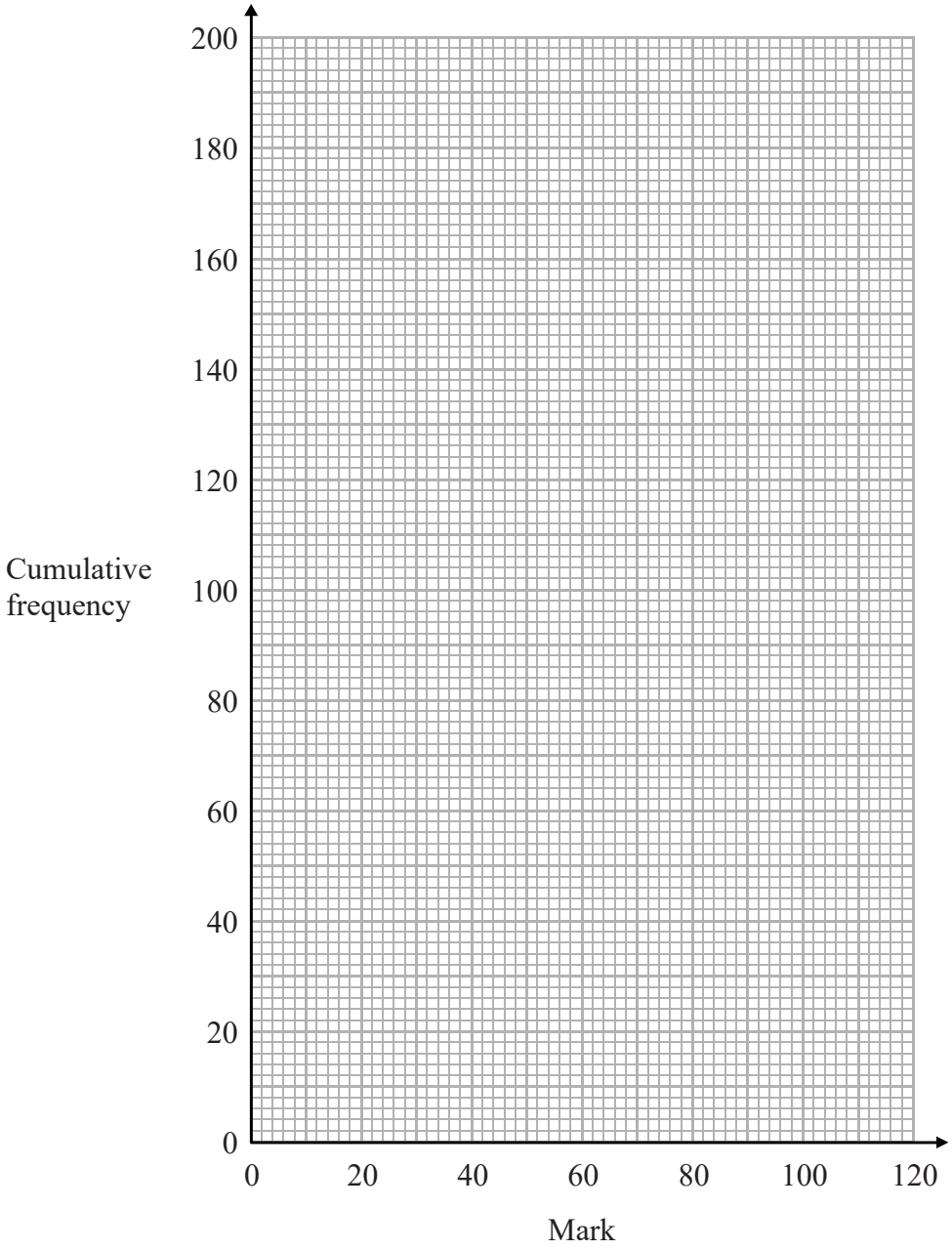
Mark (m)	Cumulative frequency
$0 < m \leqslant 20$	
$0 < m \leqslant 40$	
$0 < m \leqslant 60$	
$0 < m \leqslant 80$	
$0 < m \leqslant 100$	
$0 < m \leqslant 120$	

(1)

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(b) On the grid, draw a cumulative frequency graph for your table.



(2)

(c) Use your graph to find an estimate for the median mark.

(1)

(d) Use your graph to find an estimate for the number of students who gained more than 75 marks.

(2)

(Total for Question 13 is 6 marks)

14 (a) Solve $\frac{2w-3}{7}+\frac{2w-5}{3}=2$

Show clear algebraic working.

$w =$

(3)

(b) Make e the subject of the formula $t=\sqrt{\frac{3e+7}{e-3}}$

(4)

(Total for Question 14 is 7 marks)

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15 Henry puts 8 coins in a bag.
The table gives information about the value of the coins.

Value of coin	5p	2p	1p
Number of coins	5	2	1

Henry then takes at random two coins from the bag.

(a) Work out the probability that the two coins are both 5p coins.

(2)

(b) Work out the probability that the total value of the two coins is at least 6p.

(3)

(Total for Question 15 is 5 marks)

16 p is directly proportional to the cube of w

$p = 37.5$ when $w = 5$

(a) Find a formula for p in terms of w

(3)

(b) Calculate the value of p when $w = 4$

(1)

(Total for Question 16 is 4 marks)

17 Simplify $\left(5h^{\frac{4}{3}}g^2\right)^3$

(Total for Question 17 is 2 marks)

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18 The functions f and g are defined as

$$f(x) = \frac{3x}{4 - x} \qquad x \neq 4$$

$$g(x) = \frac{2x + 1}{3}$$

(a) Find gf(7)

(2)

(b) Express the inverse function g^{-1} in the form $g^{-1}(x) = ...$

$g^{-1}(x) =$

(2)

(c) Find $fg(x)$
Simplify your answer.

$fg(x) =$

(2)

(Total for Question 18 is 6 marks)

19 The diagram shows a rectangular based pyramid.

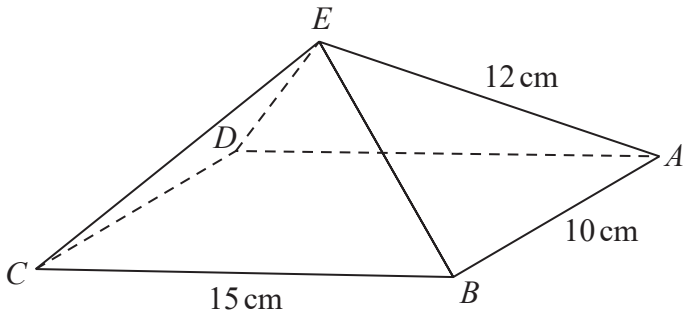


Diagram **NOT** accurately drawn

$AE = BE = CE = DE = 12$ cm
$AB = 10$ cm and $CB = 15$ cm

Calculate the size of angle CEA.
Give your answer correct to 1 decimal place.

°

(Total for Question 19 is 4 marks)

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20 OAB is a triangle.

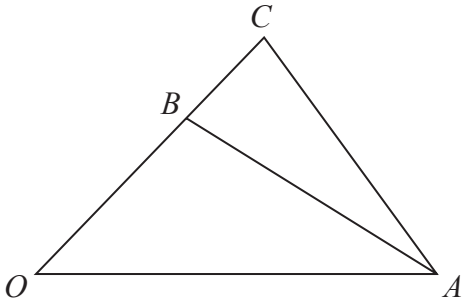


Diagram **NOT** accurately drawn

$\overrightarrow{OA} = 3\mathbf{a}$ $\overrightarrow{OB} = 3\mathbf{b}$ $\overrightarrow{OC} = \frac{4}{3}\overrightarrow{OB}$

Q is the point on AC such that $AQ = \frac{3}{5}AC$

P is the point on BA such that $BP = \frac{1}{3}BA$

Using a vector method, prove that OPQ is a straight line.

(Total for Question 20 is 4 marks)

21 Here is a right-angled triangle.

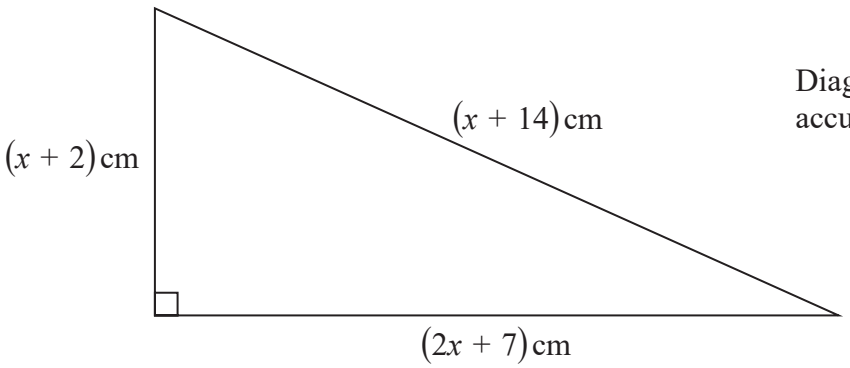


Diagram **NOT** accurately drawn

The area of the triangle is A cm^2

Work out the value of A.
Show your working clearly.

$A =$

(Total for Question 21 is 6 marks)

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22 The diagram shows a sector $OABC$ of a circle, centre O and radius 15 cm.

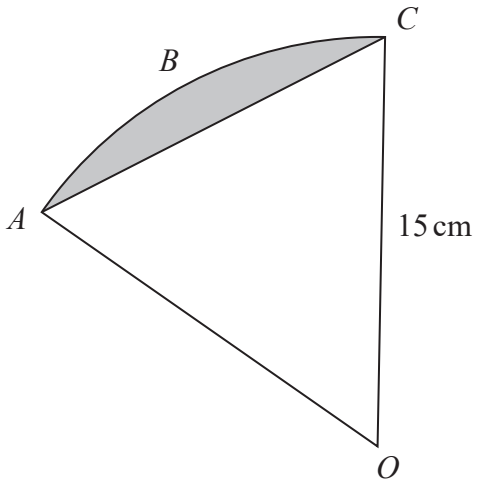


Diagram **NOT** accurately drawn

The length of arc $ABC = 3\pi$ cm.

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

cm^2

(Total for Question 22 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

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