

Write your name here

Surname

Other names

Centre Number

Candidate Number

Pearson Edexcel
Level 1/Level 2 GCSE (9 - 1)

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Mathematics

Paper 1 (Non-Calculator)

Higher Tier

Mock Set 3 – Autumn 2017

Time: 1 hour 30 minutes

Paper Reference

1MA1/1H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.
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.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may not be used.**



Information

- The total mark for this paper is 80
- 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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (a) Write $\frac{3^5 \times 3^4}{3^2}$ as a power of 3

.....
(2)

(b) Write down the value of 12^0

.....
(1)

(c) Write down the value of 3^{-2}

.....
(1)

(Total for Question 1 is 4 marks)

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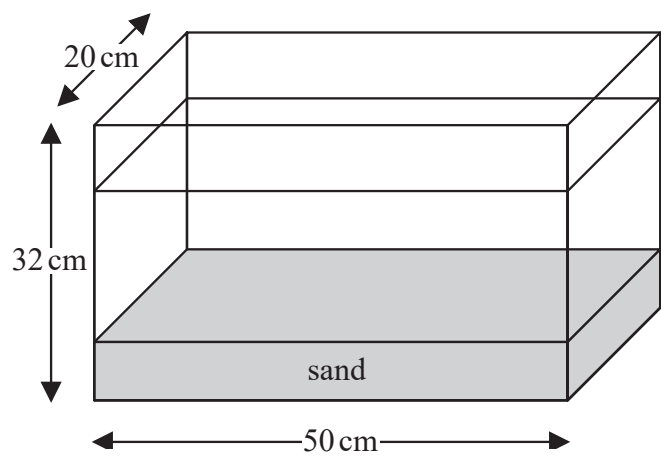


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2 The diagram shows a fish tank in the shape of a cuboid.



The dimensions of the tank are 50 cm by 32 cm by 20 cm.

The tank is $\frac{3}{4}$ full of water and sand.

The ratio of the volume of water to the volume of sand is 5 : 1

Work out the number of litres of water in the tank.

You must show all your working.

.....litres

(Total for Question 2 is 5 marks)



- 3 In a sale, the price of a cooker is reduced by 50%
At the end of the sale, the sale price of the cooker is increased by 50%

Betty says,

“The cooker is now the same price as it was before the sale.”

Is Betty correct?

Explain why.

.....

.....

.....

(Total for Question 3 is 2 marks)

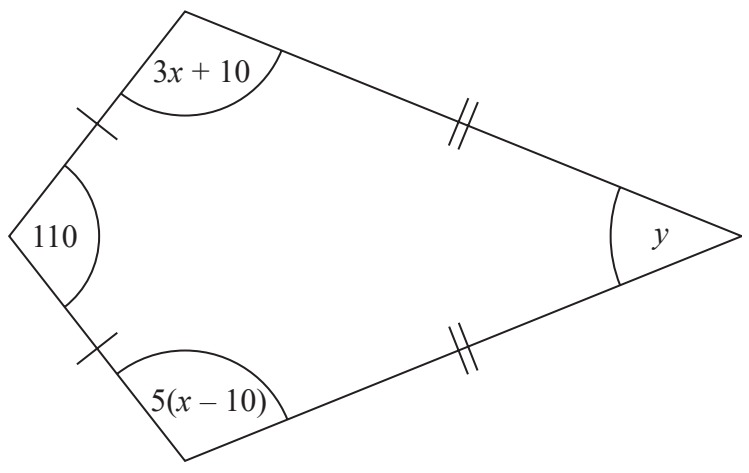


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4 Here is a kite.



All angles are measured in degrees.

Work out the value of y .

(Total for Question 4 is 4 marks)



5 Solve the simultaneous equations

$$\begin{aligned}3x - 2y &= -5 \\2x - 4y &= 2\end{aligned}$$

$x = \dots\dots\dots$

$y = \dots\dots\dots$

(Total for Question 5 is 3 marks)

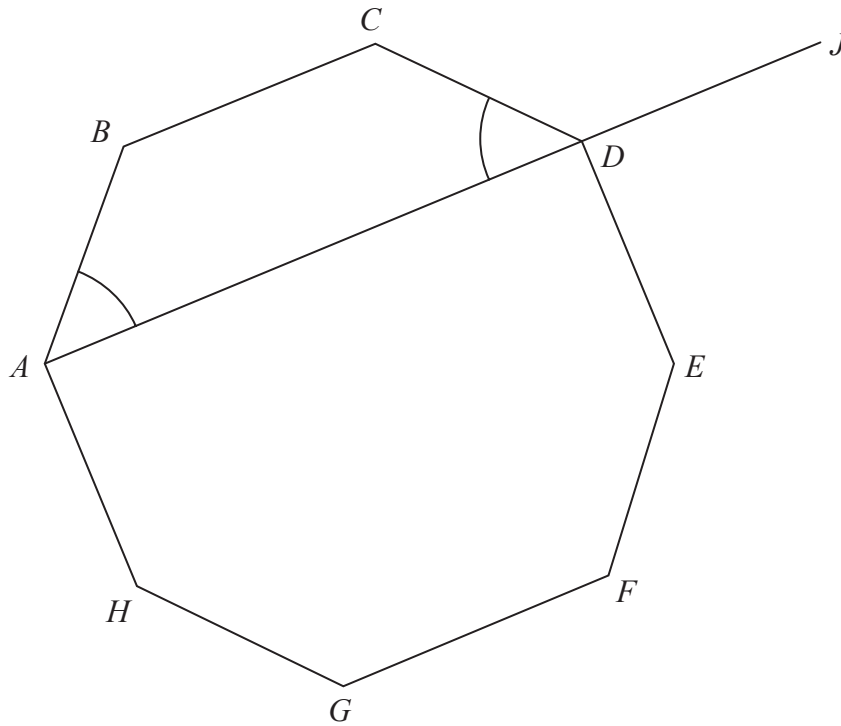
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6



ABCDEFGH is a regular octagon.
ADJ is a straight line.

angle *BAD* = angle *CDA*

Show that angle *CDJ* = 135°

(Total for Question 6 is 4 marks)



7 (a) Write 0.005 49 in standard form.

.....
(1)

(b) Find the value of $(8 \times 10^3)^2$
Give your answer in standard form.

.....
(2)

(c) Find the value of $(7.6 \times 10^5) + (8.7 \times 10^4)$
Give your answer in standard form.

.....
(2)

(Total for Question 7 is 5 marks)



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8 20 men, 10 women and 10 children are in a competition.

The mean score for the women is 15.6

The mean score for the children is 9.2

Kevin says that the mean score for all 40 people is 11.2

(a) Work out the mean score for the men.

.....
(3)

Kevin was wrong.

The mean score for all 40 people was actually 11.15

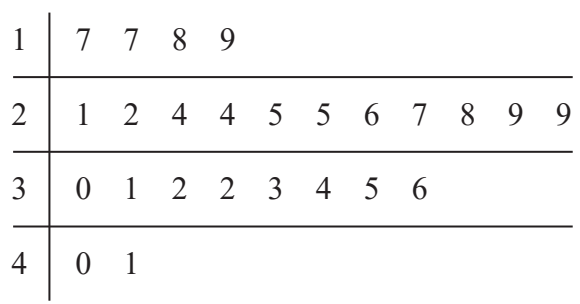
(b) How does this affect the mean score for the men?

.....
.....
(1)

(Total for Question 8 is 4 marks)

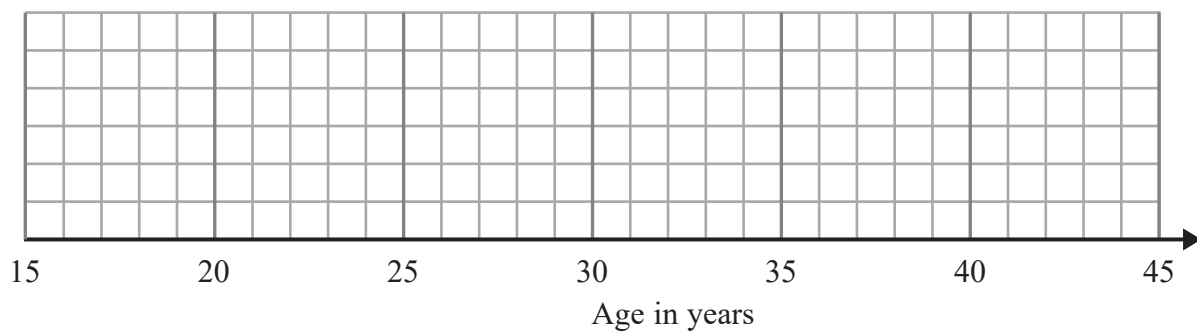


9 The stem and leaf diagram shows the ages, in years, of 25 people.



Key: 1|7 represents 17 years

(a) (i) On the grid, draw a box plot for this information.



(3)

One of these people is chosen at random.

(ii) What is the probability that this person is 30 years of age or older?

(2)



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

Age (a years)	Frequency
$0 < a \leq 20$	7
$20 < a \leq 30$	12
$30 < a \leq 40$	5
$40 < a \leq 50$	1

Anne drew this cumulative frequency table for this information.

Age (a years)	Cumulative frequency
$0 < a \leq 20$	7
$20 < a \leq 30$	19
$30 < a \leq 40$	24
$40 < a \leq 50$	25

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

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

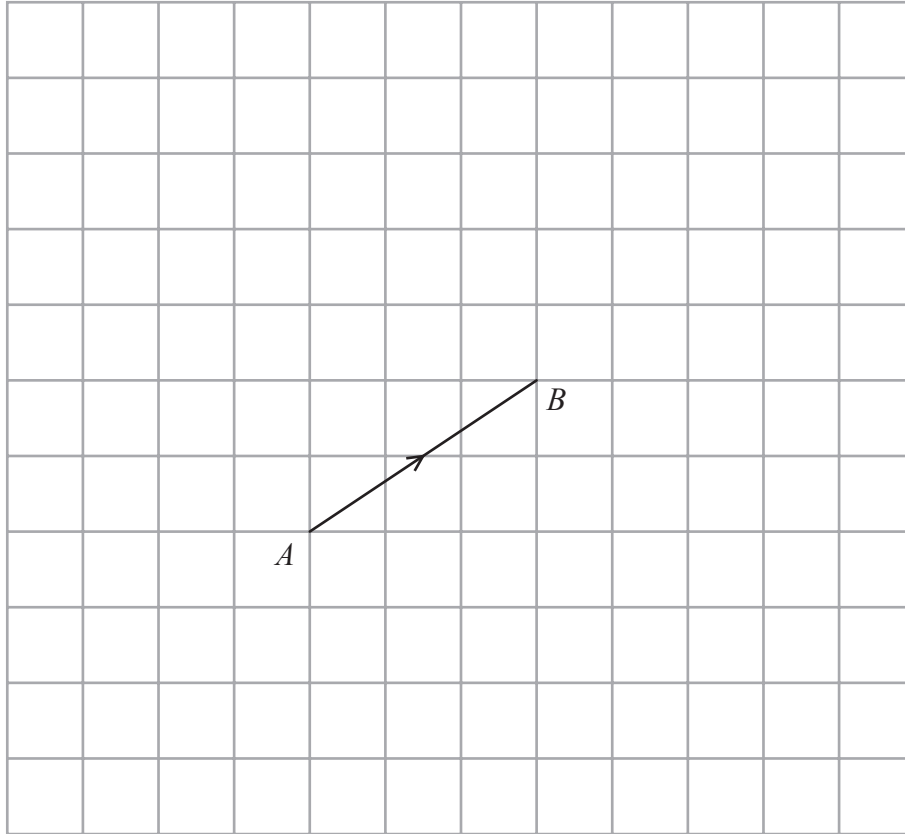
(1)

(Total for Question 9 is 6 marks)



10 $\vec{AB} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$ and $\vec{BC} = \begin{pmatrix} -1 \\ 4 \end{pmatrix}$

\vec{AB} is shown on the grid.



(a) On the grid, draw \vec{BC} .

(1)

$$\vec{AD} = \vec{AB} - \vec{BC}$$

(b) On the grid, mark with a cross (×) the position of D .
Label this point D .

(2)

(Total for Question 10 is 3 marks)

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11 P is inversely proportional to the square root of m .

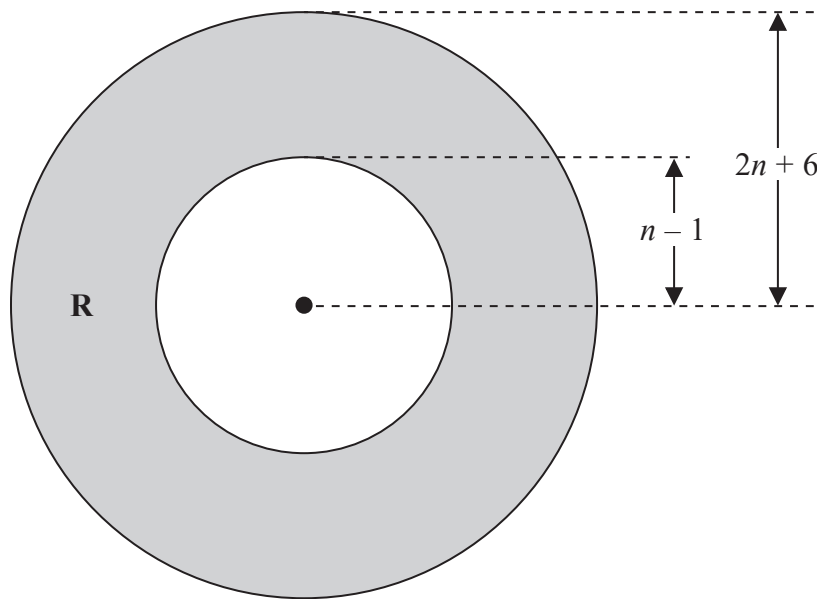
$$P = 10 \text{ when } m = \frac{1}{4}$$

Work out the value of m when $P = 2$

.....
(Total for Question 11 is 3 marks)



- 12 The region **R**, shown shaded in the diagram, is the region between two circles with the same centre.



The outer circle has radius $(2n + 6)$
The inner circle has radius $(n - 1)$
All measurements are in centimetres.

The area of **R** is greater than the area of a circle of radius $(n + 13)$ cm.

n is an integer.

Find the least possible value of n .
You must show all of your working.

(Total for Question 12 is 5 marks)

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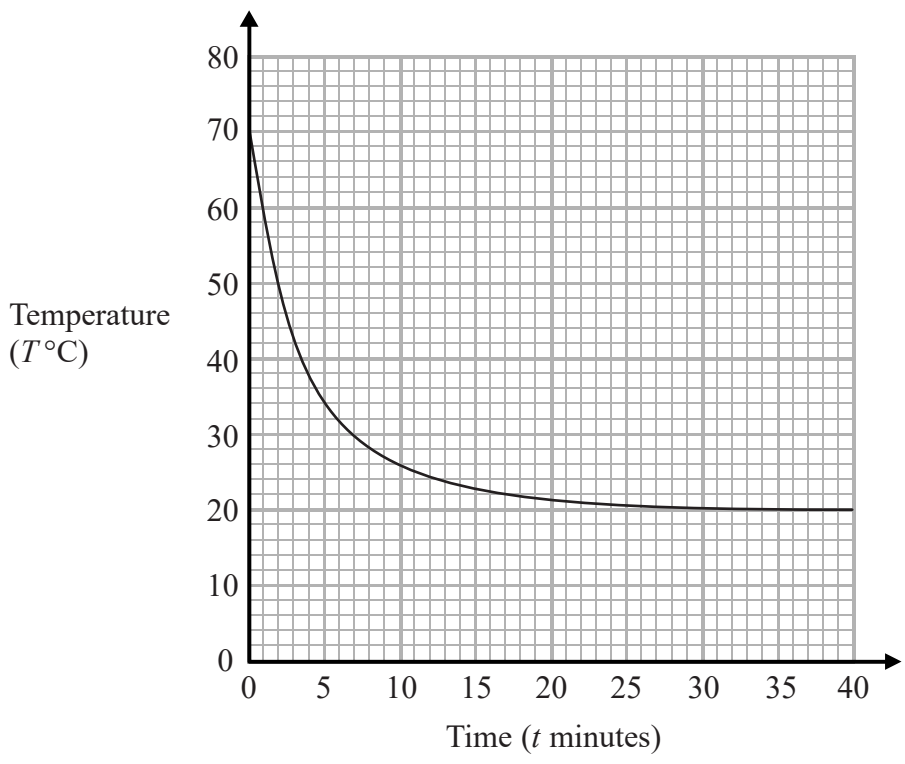


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13 The graph shows the temperature, $T^{\circ}\text{C}$, of the coffee in a cup at a time t minutes.



(a) Find an estimate for the gradient of the graph at time 5 minutes.

.....
(2)

(b) Explain what this gradient represents.

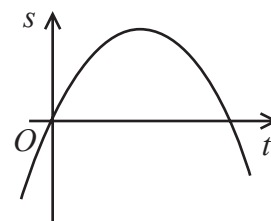
.....
.....
(1)

(Total for Question 13 is 3 marks)



- 14 A particle P is moving in a straight line.
 O is a fixed point on the straight line.
The distance, s metres, of P from O at time t seconds is given by

$$s = 80t - 5t^2$$



Use algebra to find the greatest distance of P from O when $0 \leq t \leq 16$

.....metres

(Total for Question 14 is 4 marks)

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15 There are only n red balls and $(n + 1)$ blue balls in a bag.

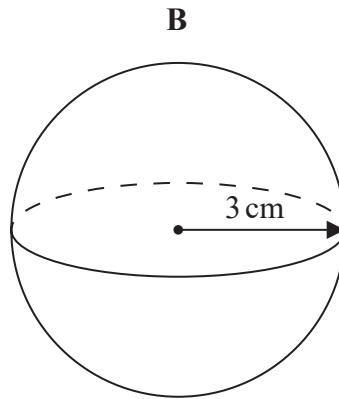
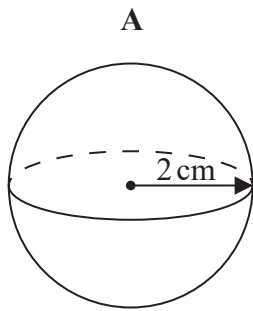
Shamsa takes at random 2 balls from the bag.

Show that the probability that both balls are the same colour is $\frac{n}{2n + 1}$

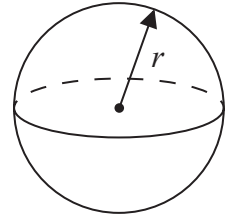
(Total for Question 15 is 4 marks)



16 Here are two solid spheres, A and B.



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



Sphere **A** is made of gold.
Sphere **B** is made of silver.

Sphere **A** has radius 2 cm.
Sphere **B** has radius 3 cm.

Gold has a density of $19\,000\text{ kg/m}^3$
Silver has a density of $10\,000\text{ kg/m}^3$

Which sphere has the greater mass?
You must show how you get your answer.

(Total for Question 16 is 4 marks)

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

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

..... (3)

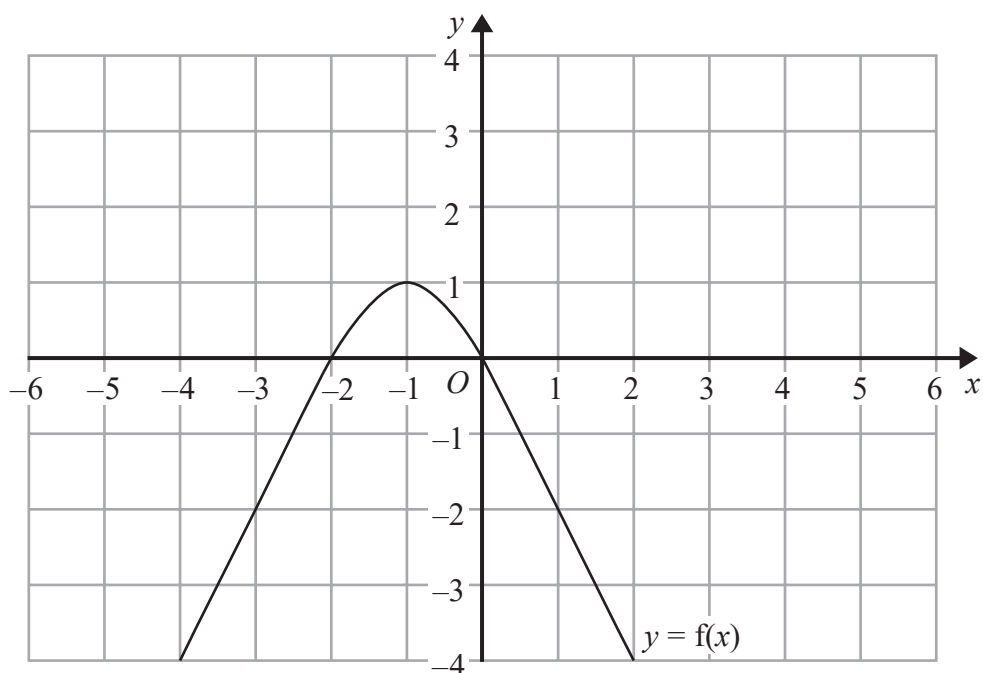
(b) Simplify fully $\frac{3 - 4x - 4x^2}{2x^2 - 7x + 3}$

..... (3)

(Total for Question 17 is 6 marks)



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



(a) On the grid, sketch the graph of $y = f(x - 1)$

(1)

The graph of $y = f(x)$ has a turning point at the point $(-1, 1)$

(b) Write down the coordinates of the turning point of the graph of $y = f(-x) + 2$

(.....,)
(1)

(Total for Question 18 is 2 marks)



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19 $\frac{1 + \sqrt{2}}{(3 - \sqrt{2})^2}$ can be written in the form $a + b\sqrt{2}$

Find the value of a and the value of b .

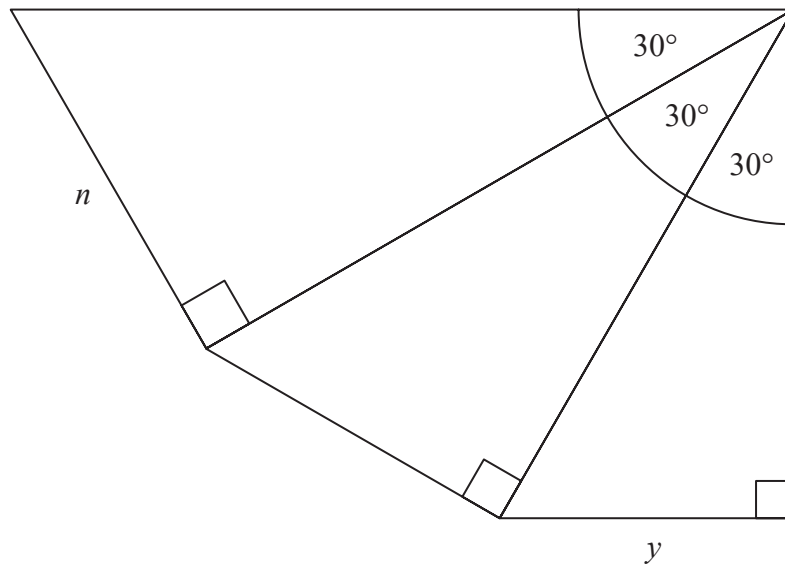
$a = \dots\dots\dots$

$b = \dots\dots\dots$

(Total for Question 19 is 5 marks)



20



The diagram shows three right-angled triangles.

Prove that $y = \frac{3}{4}n$

(Total for Question 20 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

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