Please check the examination details below before entering your candidate information

| Candidate surname | Other names |
|---|---|
| | |

Centre Number | Candidate Number

# Pearson Edexcel International GCSE

## Thursday 15 May 2025

Morning (Time: 2 hours)

Paper reference **4MA1/1HR**

# Mathematics A

**PAPER 1HR**
**Higher Tier**

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of 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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Pearson

**International GCSE Mathematics**

**Formulae sheet – Higher Tier**

**Arithmetic series**

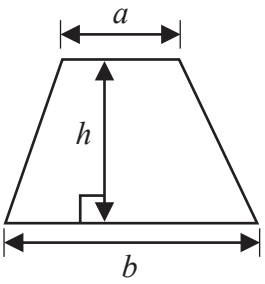
Sum to $n$ terms, $S_n = \frac{n}{2}[2a + (n-1)d]$

**The quadratic equation**

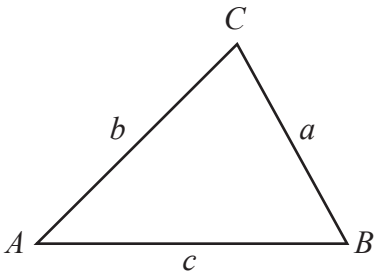
The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$ are given by:

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

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




**Trigonometry**




**In any triangle** ***ABC***

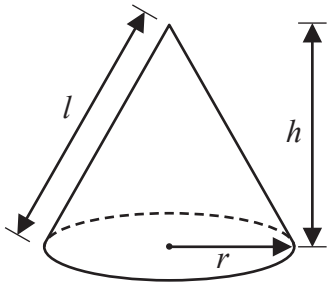
**Sine Rule** $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule** $a^2 = b^2 + c^2 - 2bc\cos A$

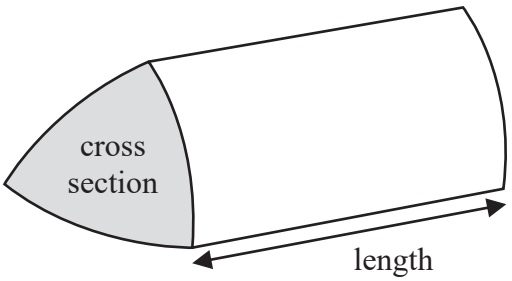
**Area of triangle** $= \frac{1}{2}ab\sin C$

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

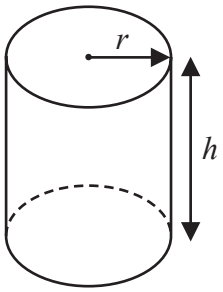
**Curved surface area of cone** $= \pi r l$




**Volume of prism**
= area of cross section × length

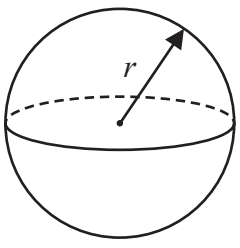



**Volume of cylinder** $= \pi r^2 h$
**Curved surface area of cylinder** $= 2\pi r h$




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

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



**Answer ALL TWENTY SIX questions.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

**1** Find the lowest common multiple (LCM) of 45 and 70

.....

**(Total for Question 1 is 2 marks)**

**2** The length of a ship is 142.8 m, correct to 1 decimal place.

(i) Write down the lower bound of the length of the ship.

..... m

**(1)**

(ii) Write down the upper bound of the length of the ship.

..... m

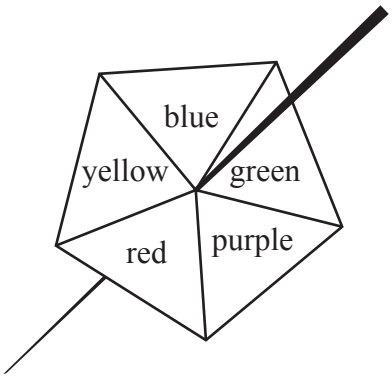
**(1)**

**(Total for Question 2 is 2 marks)**

**3** Show that $2\frac{1}{4} \times 1\frac{5}{7} = 3\frac{6}{7}$

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

**4** Here is a biased 5-sided spinner.
When the spinner is spun, it can land on blue or on green or on purple or on red or on yellow.




The table gives information about the probability of the spinner landing on each colour.

| **Colour** | blue | green | purple | red | yellow |
|---|---|---|---|---|---|
| **Probability** | 0.12 | 0.20 | 0.38 | $4x$ | $x$ |

Sophie spins the spinner once.

(a) Work out the probability that the spinner lands on blue or on green or on purple.

.....

**(1)**

Max spins the spinner 350 times.

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

.....

**(4)**

**(Total for Question 4 is 5 marks)**

**5** $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

$A = \{2, 4, 6, 8, 10, 12\}$

$B = \{3, 6, 9, 12\}$

$C = \{1, 3, 5, 7, 9, 11\}$

(a) List the members of the set

(i) $A \cup B$

.....

(ii) $B'$

.....

**(2)**

$\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

$A = \{2, 4, 6, 8, 10, 12\}$

$B = \{3, 6, 9, 12\}$

$C = \{1, 3, 5, 7, 9, 11\}$

| | | | | | |
|---|---|---|---|---|---|
| $\mathscr{E}$ | $\cap$ | $\cup$ | $\varnothing$ | $\in$ | $\notin$ |

(b) Write a symbol from the box on each dotted line to make each of the following a true statement.

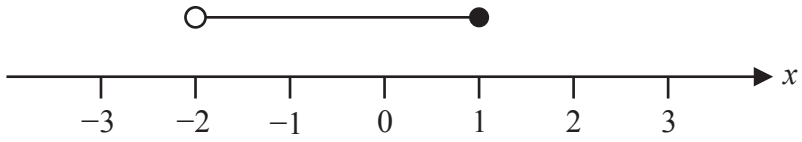
(i) $A \cap C =$ .....

(ii) 13 ..... $\mathscr{E}$

**(2)**

**(Total for Question 5 is 4 marks)**

**6**




(a) Write down the inequality shown on the number line.

.....

**(2)**

(b) Solve the inequality $7a - 5 \leqslant 3a + 28$
Show clear algebraic working.

.....

**(2)**

**(Total for Question 6 is 4 marks)**

**7** Change a speed of $50x$ metres per second to a speed in kilometres per hour.

..... km/h

**(Total for Question 7 is 3 marks)**

**8** (a) Simplify $a^6 \times a^{10}$

.....

**(1)**

(b) Simplify $c^{30} \div c^{12}$

.....

**(1)**

(c) (i) Factorise $y^2 - 10y + 21$

.....

**(2)**

(ii) Hence, solve $y^2 - 10y + 21 = 0$

.....

**(1)**

**(Total for Question 8 is 5 marks)**

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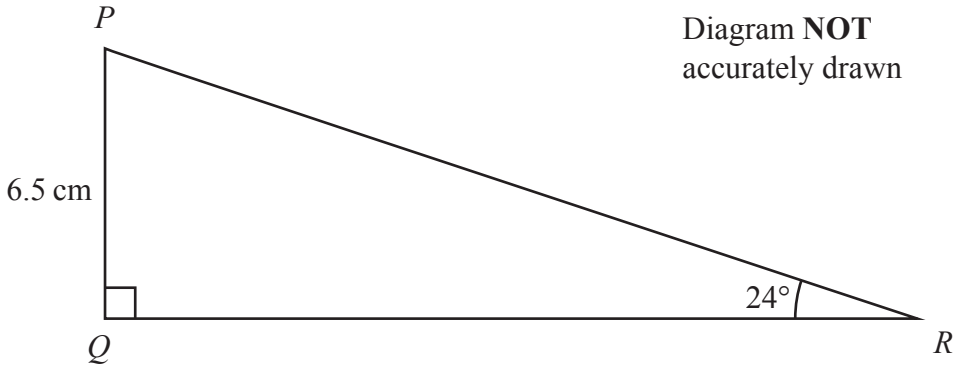
**9** The diagram shows triangle $PQR$



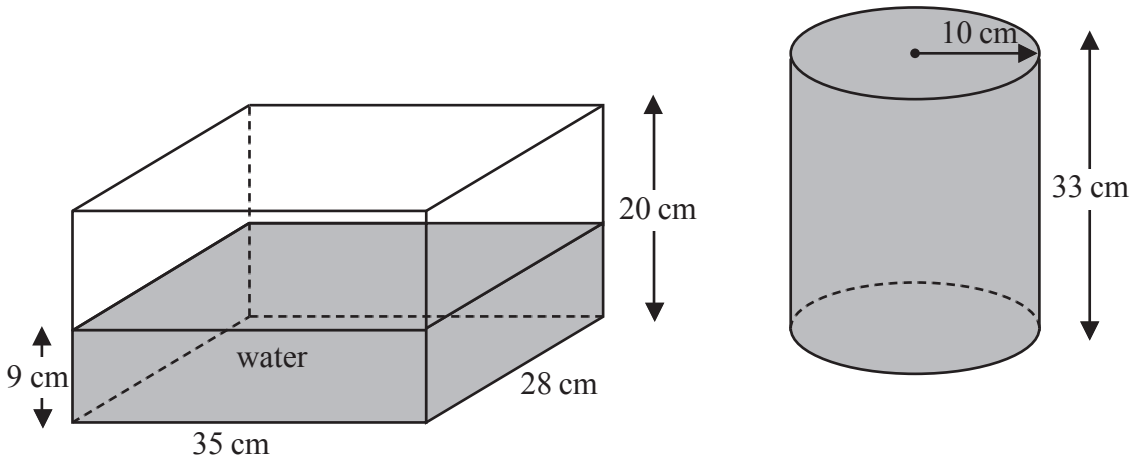

Work out the length of $QR$
Give your answer correct to 3 significant figures.

..... cm

**(Total for Question 9 is 3 marks)**

**10** The diagram shows two water containers.
One is a cuboid and one is a cylinder.

Diagram **NOT** accurately drawn




The cuboid measures 35 cm by 28 cm by 20 cm
The surface of the water in the cuboid is 9 cm above the base of the cuboid.

The cylinder has a radius of 10 cm and a height of 33 cm
The cylinder is completely full of water.

Izzy is going to pour all the water from the cylinder into the cuboid.

Show that the cuboid will not be completely full of water.

**(Total for Question 10 is 3 marks)**

**11** Zhou invests some money for 2 years.
He invests \$2500 with Bank A and \$3000 with Bank B.

**Bank A**

Invests \$2500

amount of money invested : total amount of interest after 2 years = 20 : 3

**Bank B**

Invests \$3000

4% per year compound interest for 2 years

Zhou receives more **interest** from Bank A than from Bank B.

How much more?

\$ .....

**(Total for Question 11 is 5 marks)**

**12** The table gives information about the ages of 80 people in a cinema.

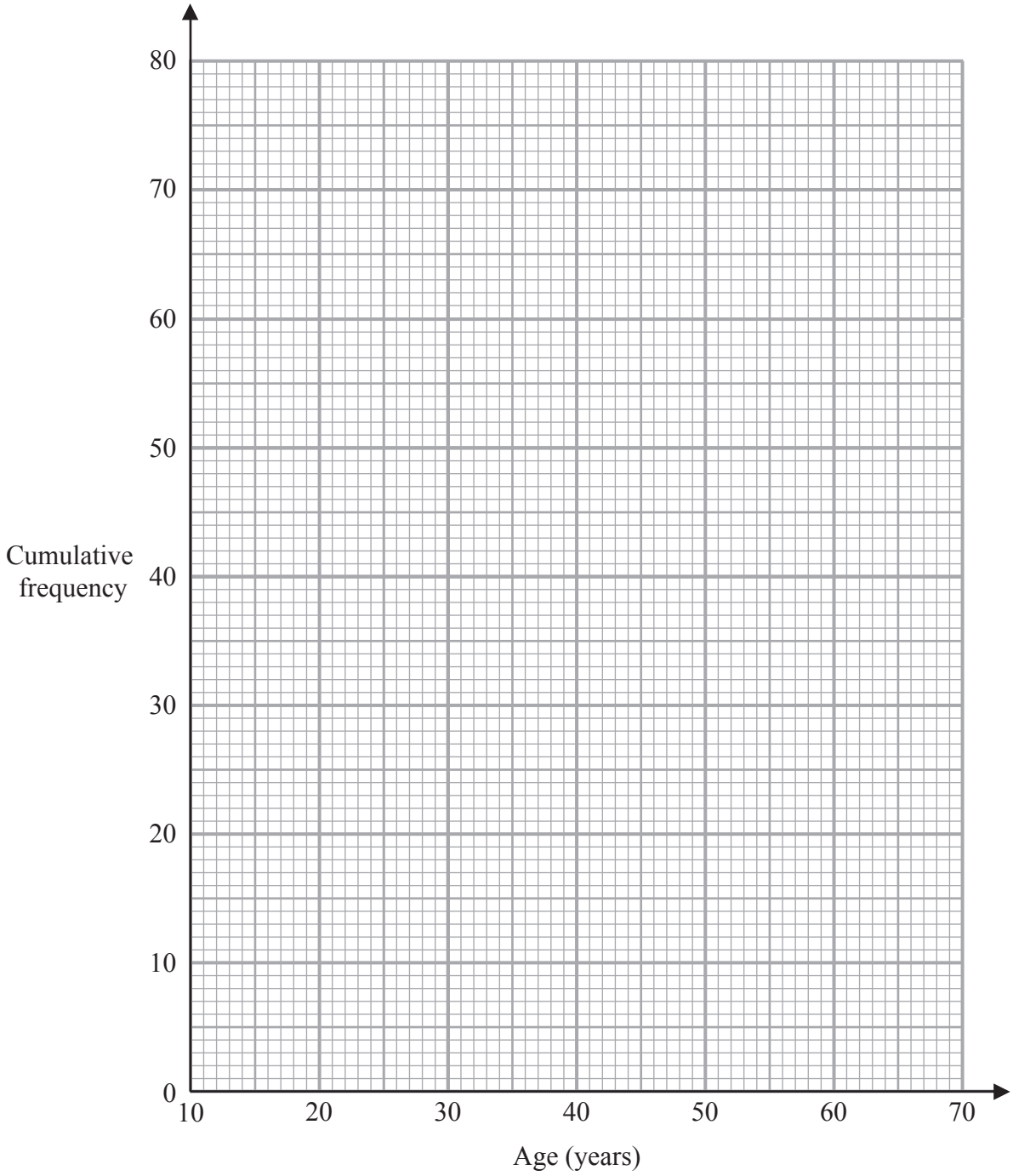
| Age ($n$ years) | Frequency |
|---|---|
| $10 < n \leqslant 20$ | 12 |
| $20 < n \leqslant 30$ | 15 |
| $30 < n \leqslant 40$ | 20 |
| $40 < n \leqslant 50$ | 18 |
| $50 < n \leqslant 60$ | 9 |
| $60 < n \leqslant 70$ | 6 |

(a) Complete the cumulative frequency table.

| Age ($n$ years) | Cumulative frequency |
|---|---|
| $10 < n \leqslant 20$ | |
| $10 < n \leqslant 30$ | |
| $10 < n \leqslant 40$ | |
| $10 < n \leqslant 50$ | |
| $10 < n \leqslant 60$ | |
| $10 < n \leqslant 70$ | |

**(1)**

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




**(2)**

(c) Use your graph to find an estimate for the percentage of the 80 people who are more than 46 years of age.
Give your answer correct to the nearest whole number.

.....%

**(3)**

**(Total for Question 12 is 6 marks)**

**13** Here are the numbers of eggs laid by some hens on each of 11 days in June.

9 10 12 15 17 18 19 19 20 25 26

Work out the interquartile range of the numbers of eggs.

.....

**(Total for Question 13 is 2 marks)**

**14** Work out $6.7 \times 10^{135} + 3 \times 10^{134}$

Give your answer in standard form.

.....

**(Total for Question 14 is 2 marks)**

**15** (a) Solve $\frac{5a+8}{3} - \frac{2a+5}{4} = 23$

Show clear algebraic working.

$a =$ .....

**(4)**

(b) Express $\left(\frac{\sqrt{y}}{3}\right)^{-1}$ in the form $cy^n$ where $c$ and $n$ are numbers to be found.

.....

**(2)**

**(Total for Question 15 is 6 marks)**

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**16** Use algebra to show that the recurring decimal $0.6\dot{1}\dot{2} = \frac{101}{165}$

**(Total for Question 16 is 2 marks)**

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**17** Prove that, for any three numbers which are consecutive multiples of 4, the difference between the square of the largest number and the square of the smallest number is always a multiple of 64

Show clear algebraic working.

**(Total for Question 17 is 3 marks)**

**18** $F$ is inversely proportional to the cube of $r$

$F = 6$ when $r = 2$

(a) Find a formula for $F$ in terms of $r$

.....

**(3)**

(b) Find the value of $r$ when $F = 3072$

$r =$ .....

**(2)**

**(Total for Question 18 is 5 marks)**

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**19** Kannika has 9 counters.
There is a number on each counter.


Kannika puts the 9 counters in a bag.
She takes at random a counter from the bag and does not replace the counter.
She then takes at random a second counter from the bag.

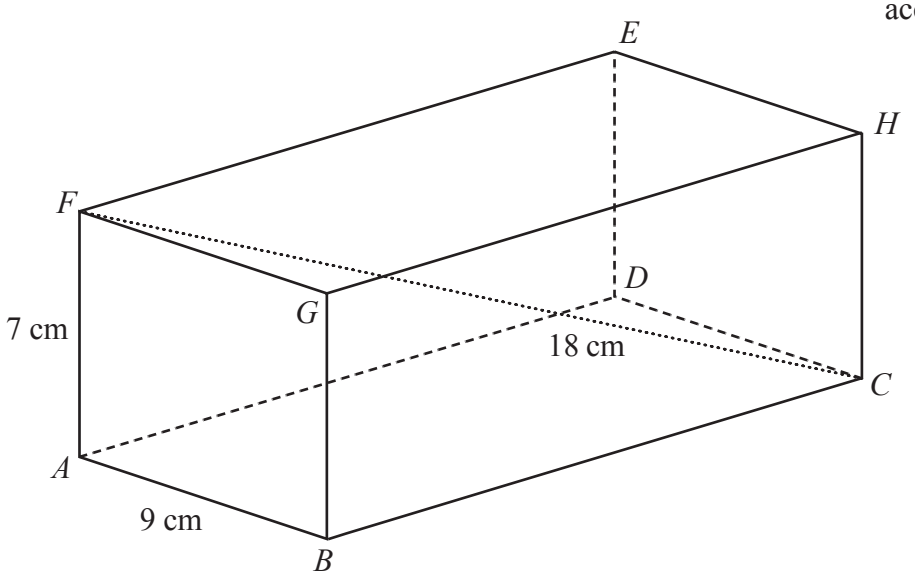
Work out the probability that the sum of the numbers on the two counters is less than 5

.....

**(Total for Question 19 is 3 marks)**

**20** The diagram shows cuboid *ABCDEFGH*

Diagram **NOT** accurately drawn




$AB = 9\,\text{cm}$ $AF = 7\,\text{cm}$ $FC = 18\,\text{cm}$

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

..... cm

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

**21** The curve with equation $y = f(x)$ has one turning point.
The coordinates of this turning point are $(-6, 9)$

(a) Write down the coordinates of the turning point on the curve with equation $y = f(3x)$

(.....  , .....)
**(1)**

The curve **C** with equation $y = g(x)$ is transformed to give the curve **S** with equation $y = g(x + a) + b$

The point $(4, -5)$ on **C** is mapped to the point $(1, -16)$ on **S**

(b) Write down the value of $a$ and the value of $b$

$a =$ .....

$b =$ .....
**(2)**

**(Total for Question 21 is 3 marks)**

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**22** Solve the simultaneous equations

$$x^2 + y^2 = 41$$
$$2x + y = 3$$

Show clear algebraic working.

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.....

**(Total for Question 22 is 5 marks)**

**23**

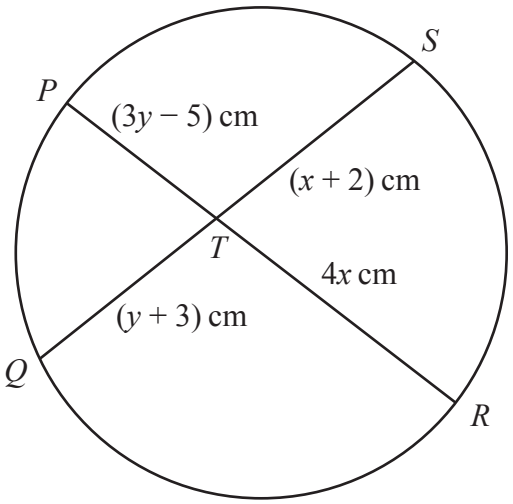


Diagram **NOT** accurately drawn

*PTR* and *QTS* are chords of a circle.

$PT = (3y - 5)\,\text{cm}$ $QT = (y + 3)\,\text{cm}$ $RT = 4x\,\text{cm}$ $ST = (x + 2)\,\text{cm}$

Find an expression for $y$ in terms of $x$

$y =$ .....

**Total for Question 23 is 5 marks)**

**24** The first 3 terms of an arithmetic series are

$$(2x + 5) \qquad (3y - 4) \qquad (4x - 2)$$

where $x$ and $y$ are constants.

The sum of the first 9 terms of the series is 216

Find the value of $x$ and the value of $y$
Show clear algebraic working.

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$x =$ .....

$y =$ .....

**(Total for Question 24 is 6 marks)**

**Turn over for Question 25**

**25**

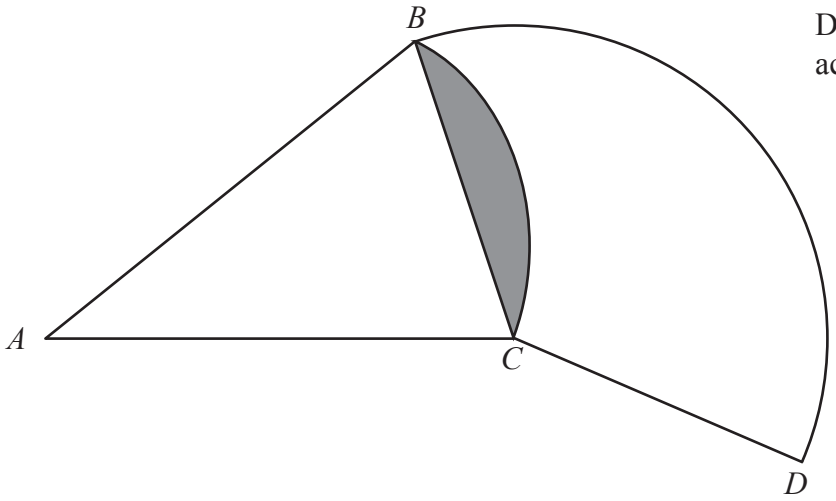


Diagram **NOT** accurately drawn

*BAC* is a sector of a circle, centre *A*

*BCD* is a sector of a circle, centre *C*

Angle *BAC* = 40°
Angle *BCD* = 130°
Area of shaded segment = 28 cm$^2$

Find the length of the arc *BD*
Give your answer correct to 3 significant figures.

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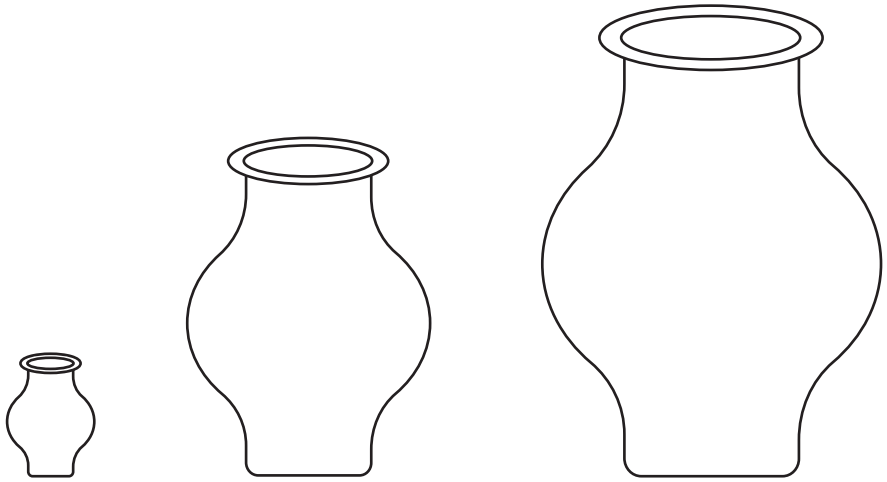
..... cm

**(Total for Question 25 is 6 marks)**

**Turn over for Question 26**

**26** **R**, **S** and **T** are three similar vases.

Diagram **NOT** accurately drawn




The volume of vase **S** is 72.8% more than the volume of vase **R**

The height of vase **R** is $h$ cm
The height of vase **T** is $6h$ cm

The surface area of vase **S** is $A$ cm$^2$
The surface area of vase **T** is $kA$ cm$^2$

Work out the value of $k$

$k =$ .....

**(Total for Question 26 is 4 marks)**

**TOTAL FOR PAPER IS 100 MARKS**