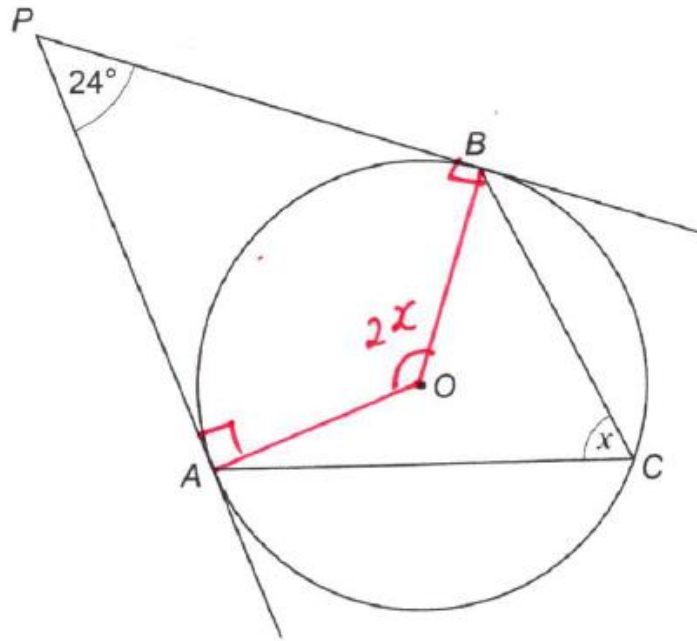


Geometry and measures – GCSE Mathematics

1. No.22

A, B and C are points on a circle, centre O.

AP and BP are tangents to the circle.

Not drawn
accuratelyWork out the size of angle x .

[3 marks]

Angles at centre of circle is twice angle
at Circumference;

$$\angle BOA = 2 \times \angle ACB$$

$$= 2x$$

Angle in a tangent is 90° , so $\angle PBO$

$$\text{and } \angle PAO = 90^\circ$$

$$2x + 90 + 90 + 24 = 360$$

$$2x = 360 - 204$$

$$\begin{array}{r} 2x = 156 \\ \hline 2 \quad \quad 2 \\ \hline x = 78 \end{array}$$

Answer

78

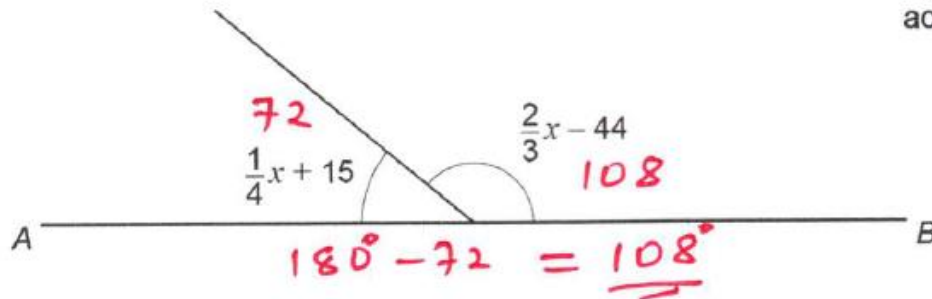
°

2. No.17

AB is a straight line.

Both angles are given in degrees.

Not drawn
accurately



By working out the value of x ,

work out the ratio smaller angle : larger angle

[4 marks]

Angles in straight line : add up to 180°

$$\frac{1}{4}x + 15 + \frac{2}{3}x - 44 = 180$$

$$\frac{1}{4}x + \frac{2}{3}x + 15 - 44 = 180$$

$$\frac{11}{12}x - 29 = 180$$

$$\frac{11}{12}x = 180 + 29$$

$$\frac{12}{11} \times \frac{11}{12}x = 209 \times \frac{12}{11}$$

$$x = \underline{228^\circ}$$

$$\frac{1}{4}x + 15 = \frac{1}{4}(228) + 15 = \underline{72^\circ}$$

Ratio

Smaller : Larger

$$\underline{72} : \underline{108}$$

$$\underline{4} : \underline{4}$$

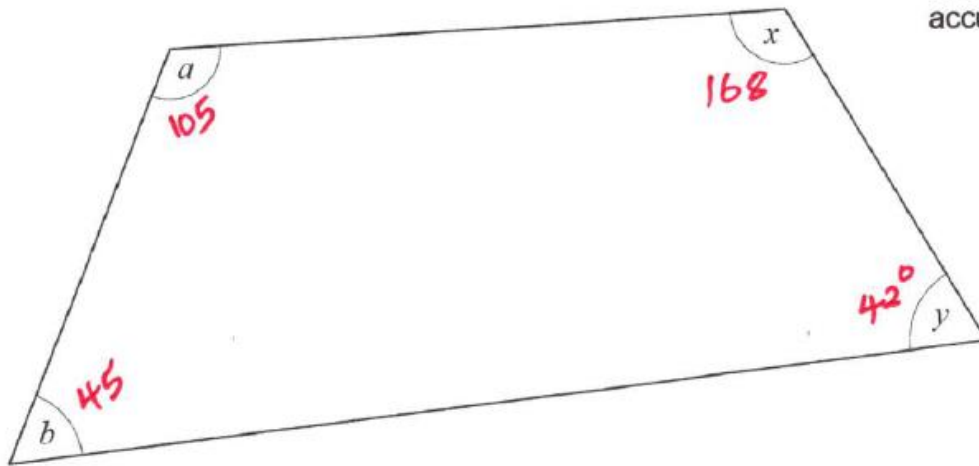
$$\underline{18} : \underline{27}$$

$$\underline{9} : \underline{9}$$

$$\underline{2} : \underline{3}$$

Answer 2 : 3

3. No.14

Not drawn
accurately

$$b = 45^\circ \quad \text{and} \quad a : b = 7 : 3 \quad \text{and} \quad x : y = 4 : 1$$

Show that $a : y = 5 : 2$

[3 marks]

$$\text{Ratio } a : b = 7 : 3$$

$$b = 45^\circ$$

$$3 \text{ parts} = 45^\circ$$

$$1 \text{ part} = ?$$

$$\frac{45 \times 1}{3} = \underline{15^\circ}$$

$$7 \text{ parts} = 7 \times 15$$

$$= \underline{105^\circ}$$

$$a : b \quad (\text{angles})$$

$$105 : 45$$

Angles in Quadrilateral
Sum up to 360°

$$x + y + 45 + 105 = 360^\circ$$

$$x + y = 360^\circ - (150^\circ)$$

$$x + y = 210^\circ$$

$$x : y$$

$$4 : 1$$

$$\text{Total Parts} = 5$$

$$x = \frac{4}{5} \times 210 = 168^\circ$$

$$y = \frac{1}{5} \times 210 = 42^\circ$$

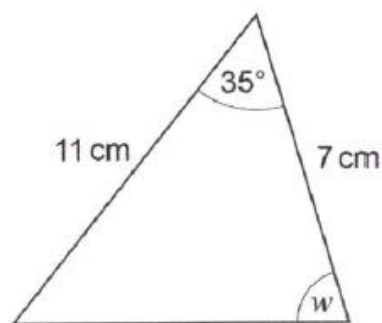
$$a : y$$

$$\frac{105}{21} : \frac{42}{21}$$

$$= \underline{\underline{5 : 2}}$$

4. No.18(b)

(b) Here is triangle B.

Not drawn
accuratelyAnna thinks that w must be 64° to the nearest degree.

She says,

"This is because triangle B has two sides and one angle the same as triangle A."

Without further calculation, is she correct?

Tick a box.

Yes

☐

No

☒

Give a reason for your answer.

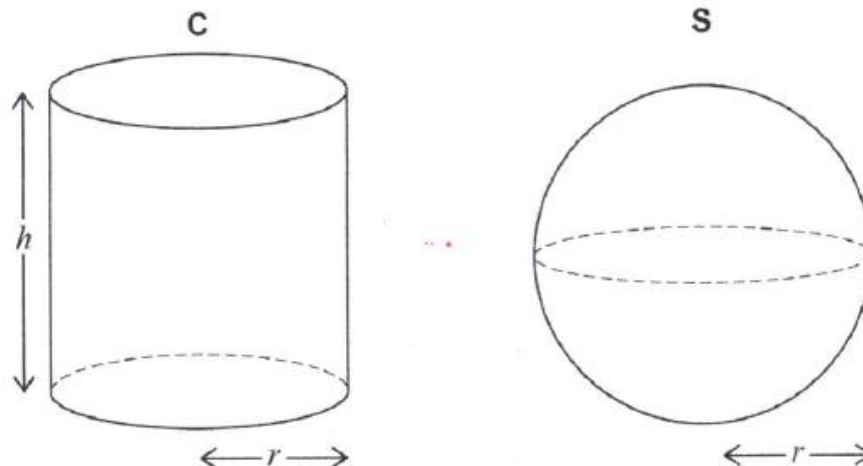
[1 mark]

Different angle between 11 cm and 7 cm,
thus angles in triangle A and B are
not same, thus not congruent.

5. No.21

A cylinder, C, and a sphere, S, each have radius r

C has height h



Volume of a sphere = $\frac{4}{3}\pi r^3$
where r is the radius

(a) volume of C = volume of S

Work out the ratio $r : h$

You **must** show your working.

$$\begin{aligned}
 &\text{Volume of Cylinder} = \pi r^2 h \\
 &\pi r^2 h = \frac{4}{3}\pi r^3 \\
 &\text{(Divide by } r^2 \text{ both sides)} \quad r^2 h = \frac{4}{3}r^3 \\
 &h = \frac{4}{3}r
 \end{aligned}
 \quad \left| \quad
 \begin{aligned}
 &h = \frac{4}{3}r \quad (\text{multiply both sides by 3}) \quad [3 \text{ marks}] \\
 &3h = 4r \\
 &4r = 3h \\
 &r : h \\
 &\text{ratio} = \underline{\underline{4 : 3}}
 \end{aligned}$$

Answer 4 : 3

- (b) A different cylinder has radius $3r$ and height $2h$.

How many times bigger is the volume of this cylinder than the volume of C?

[2 marks]

$$\text{Volume} = \pi r^2 h$$

$$= \pi (3r)^2 \times 2h$$

$$= \pi \times 9r^2 \times 2h$$

$$= 18\pi r^2 h$$

Answer

$$V = \pi r^2 h$$

times bigger is 18

18