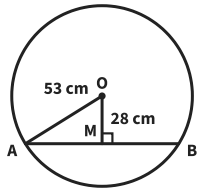
Circle theorems: chords

ANSWERS

1

O is the centre. OM is perpendicular to the chord AB. Find the length of AB.



$AM^2 =$ 53 $^2 -$ 28 ^{2}

AM = 45 cm

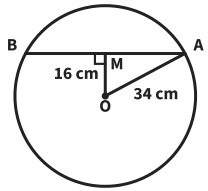
the perpendicular from the centre bisects the chord

AB = 2 × 45

AB = 90 cm

2

O is the centre. OM is perpendicular to the chord AB. Find the length of AB.



$AM^2 =$ 34 $^2 -$ 16 ^{2}

AM = 30 cm

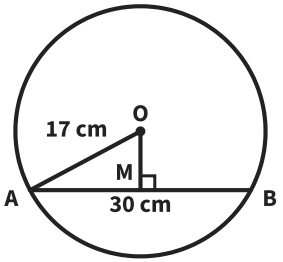
the perpendicular from the centre bisects the chord

AB = 2 × 30

AB = 60 cm

3

O is the centre and M is the midpoint of the chord AB. Find the distance OM.



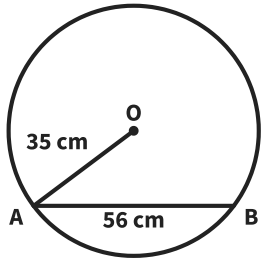
AM = 30 ÷ 2 = 15 cm

$OM^2 =$ 17 $^2 -$ 15 ^{2}

OM = 8 cm

4

O is the centre. The radius is 35 cm and the chord AB is 56 cm. Find the distance from O to AB. Give reasons.



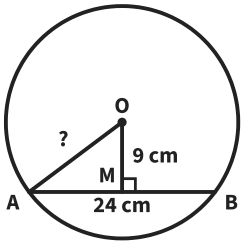
AM = 28 cm (the perpendicular from O bisects AB)

$OM^2 = 35^2 - 28^2 = 441$

Distance = 21 cm

5 Notice the change!

O is the centre. OM is perpendicular to the chord AB. Find the radius OA.



AM = 12 cm

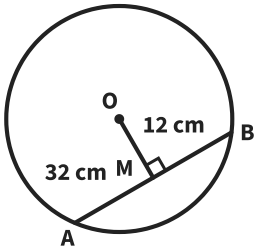
the perpendicular from the centre bisects the chord

$OA^2 =$ 9 $^2 +$ 12 ^{2}

OA = 15 cm

6

O is the centre. OM is perpendicular to the chord AB. Find the radius of the circle. Give reasons.



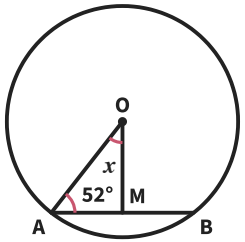
AM = 16 cm (the perpendicular bisects AB)

$r^2 = 12^2 + 16^2 = 400$

Radius = 20 cm

7

O is the centre and M is the midpoint of the chord AB. Find angle x.



Angle OMA = 90 °

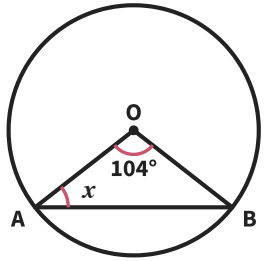
the line from the centre to the midpoint of a chord meets it at 90°

$x = 180 - 90 -$ 52

x = 38°

8

O is the centre of the circle. Find angle x. Give reasons.



OA = OB (radii), so OAB is isosceles

x = (180 − 104) ÷ 2 (base angles equal)

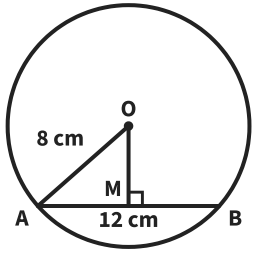
x = 38°

Circle theorems: chords *further practice*

ANSWERS

9

O is the centre and M is the midpoint of the chord AB. Find OM to 1 decimal place.



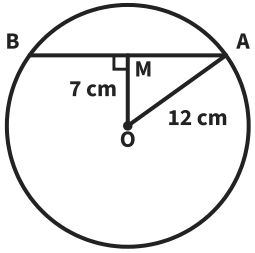
$AM = 6$ cm

$OM^2 = 8^2 - 6^2 = 28$, $OM = \sqrt{28}$

OM = 5.3 cm

10

O is the centre. OM is perpendicular to the chord AB. Find the length of AB to 1 decimal place.



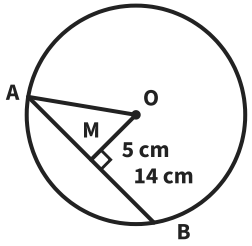
$AM^2 = 12^2 - 7^2 = 95$, $AM = 9.746...$

$AB = 2 \times 9.746...$

AB = 19.5 cm

11

O is the centre. OM is perpendicular to the chord AB. Find the radius to 1 decimal place.



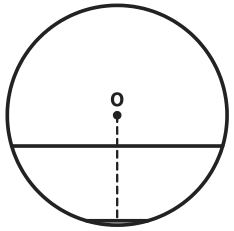
$AM = 7$ cm

$OA^2 = 5^2 + 7^2 = 74$, $OA = \sqrt{74}$

Radius = 8.6 cm

12

A circle has radius 25 cm.
Two parallel chords, 48 cm and 14 cm long, are on the same side of the centre O. How far apart are the chords?



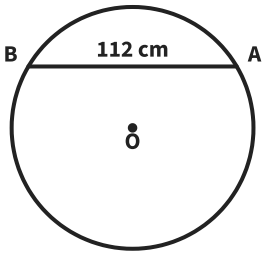
$\sqrt{(25^2 - 24^2)} = 7$ cm and $\sqrt{(25^2 - 7^2)} = 24$ cm

$24 - 7$

Distance apart = 17 cm

13

A round window has a radius of 65 cm.
A straight lead strip AB across the glass is 112 cm long. How far is the strip from the centre O?



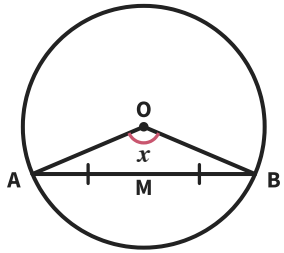
half the strip is 56 cm

$\sqrt{(65^2 - 56^2)} = \sqrt{1089}$

Distance = 33 cm

14

O is the centre and M is the midpoint of the chord AB. Angle OBM = 23°.
Find angle AOB, marked x. Give reasons.



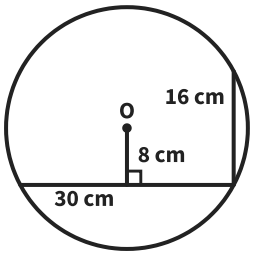
angle OMB = 90°, so angle BOM = 67°

OM is a line of symmetry: $x = 2 \times 67$

x = 134°

15

In a circle with centre O, a chord 30 cm long is 8 cm from O. Another chord is 16 cm long. How far is it from O?



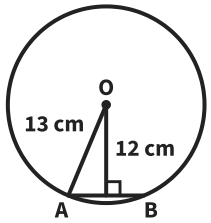
radius $= \sqrt{(15^2 + 8^2)} = 17$ cm

$\sqrt{(17^2 - 8^2)} = \sqrt{225}$

Distance = 15 cm

16

Sam says a chord 12 cm from the centre of a circle of radius 13 cm is 5 cm long.
Is he right? Explain.



No. $\sqrt{(13^2 - 12^2)} = 5$ is only AM, half the chord.

The chord is $2 \times 5 = 10$ cm.