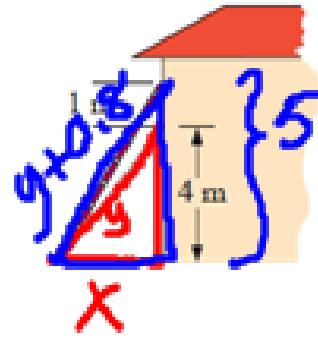


- 14 An extension ladder rests 4 m up a wall. If the ladder is extended a further 0.8 m without moving the foot of the ladder, then it will now rest 1 m further up the wall. How long is the extended ladder?



$$x^2 + 5^2 = (y + 0.8)^2 \quad x^2 + 4^2 = y^2$$

$$x^2 = (y + 0.8)^2 - 5^2$$

$$x^2 = y^2 - 4^2$$

$$y^2 - y^2 + 1.6y - 24.36 + 16 = 0$$

$$1.6y - 8.36 = 0$$

$$\frac{1.6y}{1.6} = \frac{8.36}{1.6}$$

$$y = 5.225$$

$$(y + 0.8)^2 - 25 = y^2 - 16$$

$$(y + 0.8)(y + 0.8) - 25 = y^2 - 16$$

$$y^2 + 1.6y + 0.64 - 25 = y^2 - 16$$

$$y^2 + 1.6y - 24.36 = y^2 - 16$$

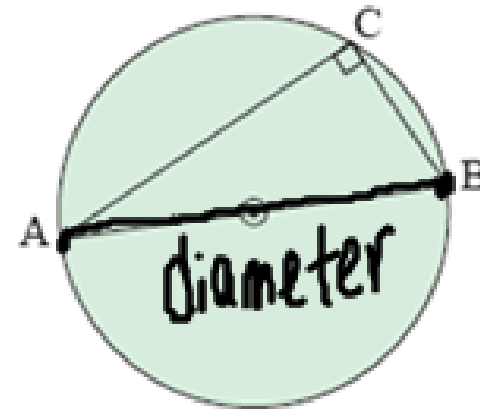
- 15** An equilateral triangle has area $16\sqrt{3}$ cm². Find the length of its sides.

4D – Circle Problems

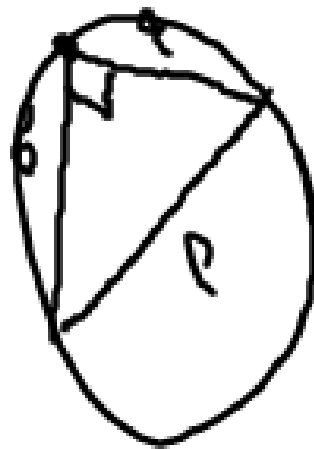
Properties of circles often involve right angles – can apply Pythagoras' theorem.

Angle in a Semi-Circle:

No matter where C is placed on the circle, the angle in a semi-circle will always be a right angle.

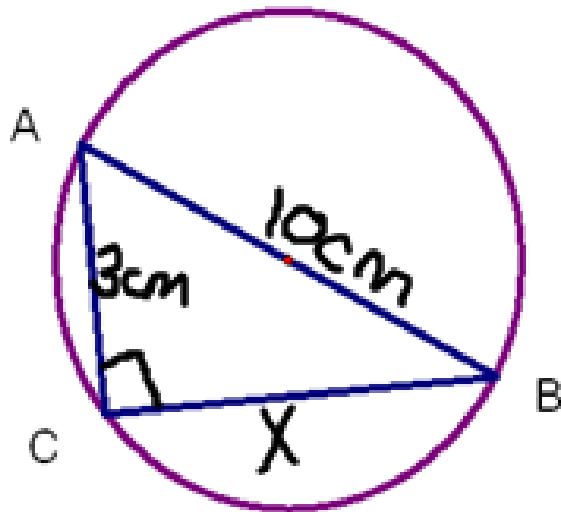


* diameter is the hypoteneuse in this case *



Example:

A circle has a diameter $[AB]$ of length 10 cm. C is a point on the circle such that AC is 3 cm. Find the length BC .



$$3^2 + x^2 = 10^2$$

$$9 + x^2 = 100$$

$$x^2 = 91$$

$$x = \pm\sqrt{91} \quad x > 0$$

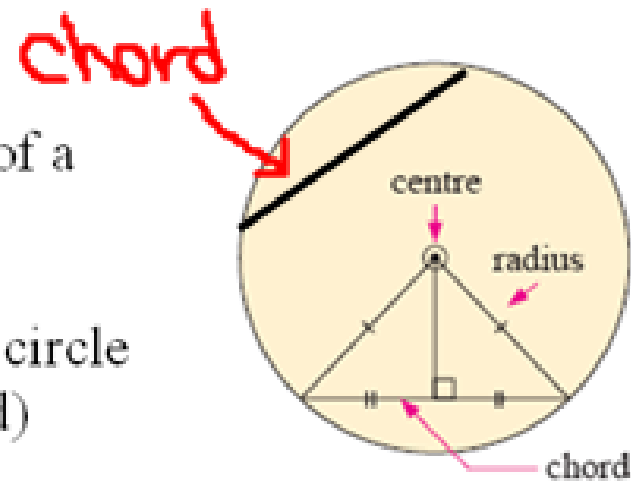
$$x = \sqrt{91}$$

$$x = 9.54 \text{ cm}$$

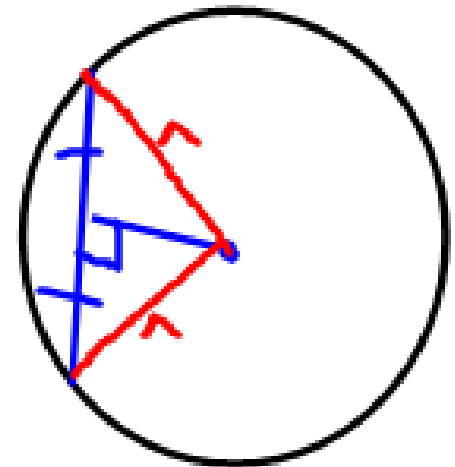
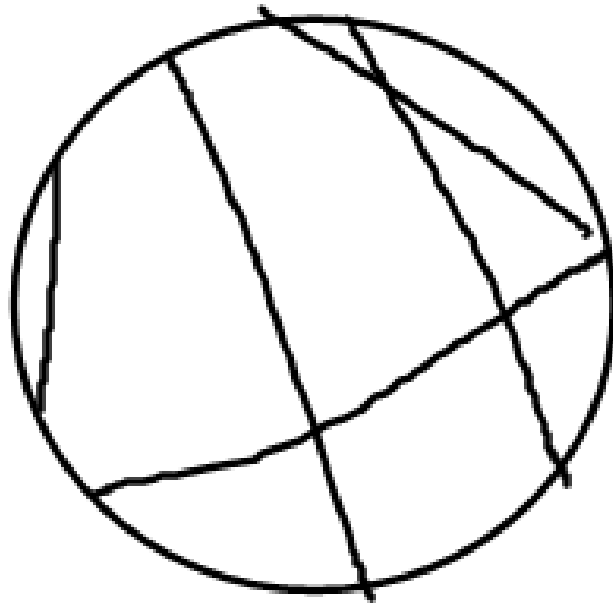
A Chord of a Circle:

A chord is a line that connects the edges of a circle.

The line drawn between the centre of the circle and the chord (at right angles to the chord) bisects the chord.



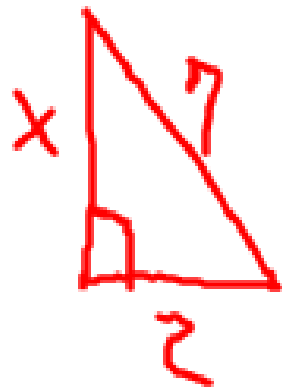
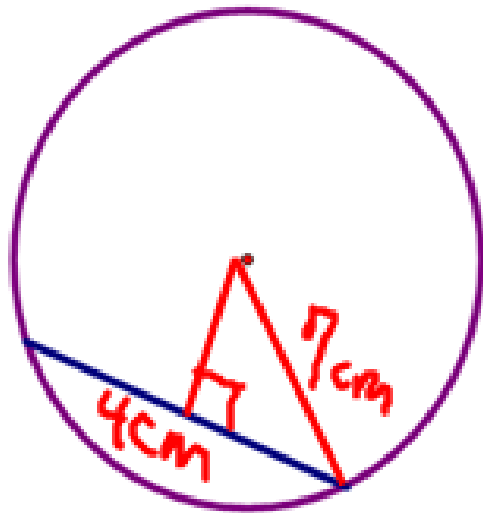
chords :



Note: the diameter is the longest chord in a circle

Example:

The radius of a circle is 7cm, and a chord is 4 cm long. Find the shortest distance from the chord to the centre of the circle.



$$x^2 + 2^2 = 7^2$$

$$x^2 + 4 = 49$$

$$x^2 = 45$$

$$x = \pm\sqrt{45} \quad x > 0$$

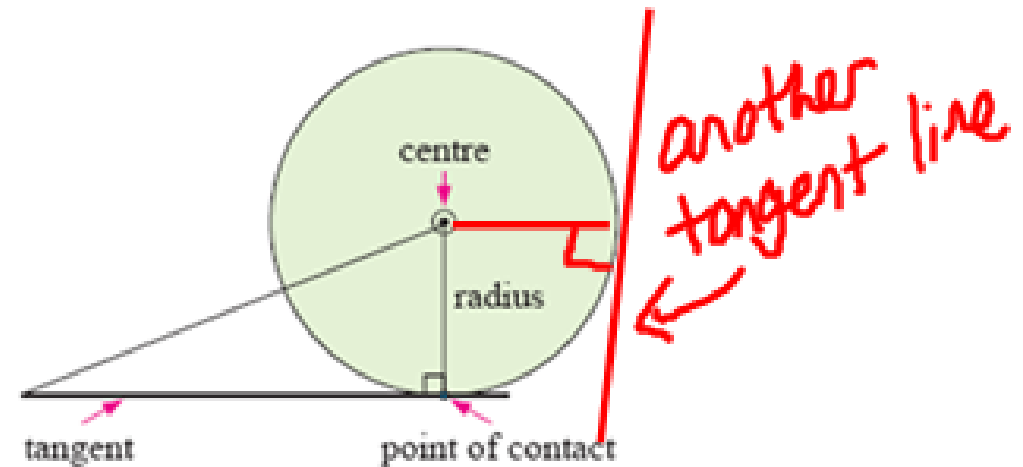
$$x = \sqrt{45}$$

$$x = 6.71 \text{ cm}$$

Tangent – Radius Property:

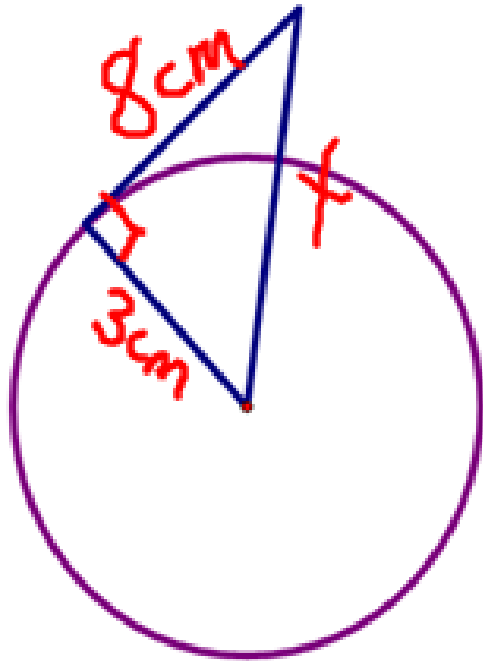
A tangent to a circle is a straight line which touches the circle at only one point.

It forms a right angle with the circle's radius, at the point of contact of the tangent.



Examples:

1. A tangent of length 8 cm is drawn to a circle with radius 3 cm.
How far is the centre of the circle from the end point of the tangent?



$$8^2 + 3^2 = x^2$$

$$64 + 9 = x^2$$

$$73 = x^2$$

$$\pm\sqrt{73} = x \quad x > 0$$

$$\sqrt{73} = x$$

$$8.54 \text{ cm} = x$$

HW: Section 4D #1-10