

Name: \_\_\_\_\_ ( ) Class: \_\_\_\_\_ Date: \_\_\_\_\_

### Lesson Worksheet 11.1B(II+)

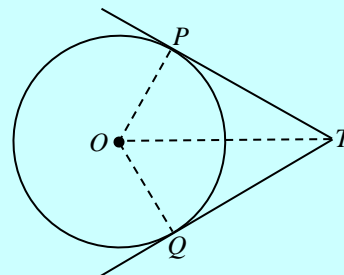
Objective: To solve questions using the property 'tangents from ext. pt.'.

In this worksheet, the centre of a circle is denoted by  $O$ .

If two tangents  $TP$  and  $TQ$  are drawn to a circle with centre  $O$  from an external point  $T$ , then:

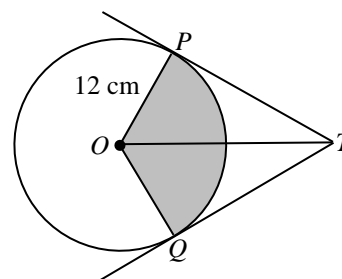
- (i)  $TP = TQ$
- (ii)  $\angle TOP = \angle TOQ$
- (iii)  $\angle OTP = \angle OTQ$

[Reference: tangents from ext. pt.]

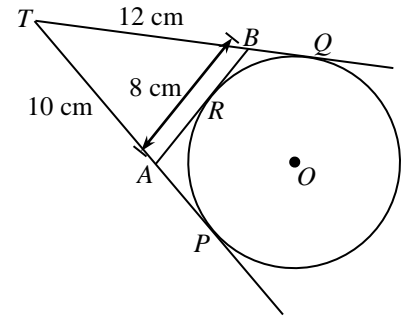


1. In the figure,  $PT$  and  $QT$  are tangents to the circle at  $P$  and  $Q$  respectively. The radius of the circle is 12 cm. The area of the shaded sector is one-third the area of the circle.

- (a) Find  $\angle POT$ .
- (b) Find the area of quadrilateral  $OPTQ$ .



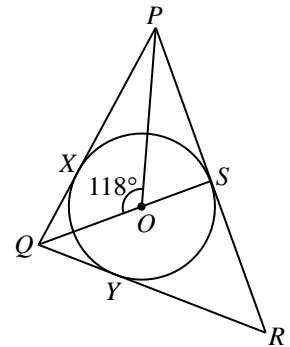
2. In the figure,  $TP$  and  $TQ$  are tangents to the circle at  $P$  and  $Q$  respectively.  $A$  and  $B$  are points on  $TP$  and  $TQ$  respectively such that  $AB$  is the tangent to the circle at  $R$ .  $TA = 10$  cm,  $TB = 12$  cm and  $AB = 8$  cm. Find  $TP$ .



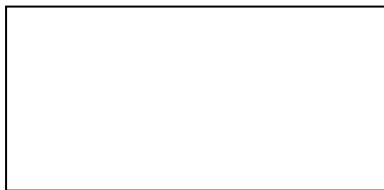
→Exercise 11.1: 19



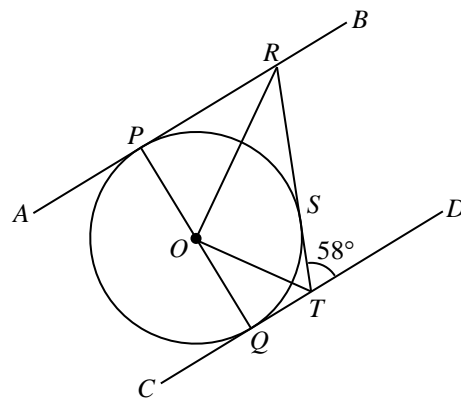
3. In the figure,  $QS$  passes through the centre  $O$  of the circle.  $PQ$ ,  $PR$  and  $QR$  are tangents to the circle at  $X$ ,  $S$  and  $Y$  respectively. If  $\angle QOP = 118^\circ$ , find  $\angle QRP$ .



→Exercise 11.1: 21

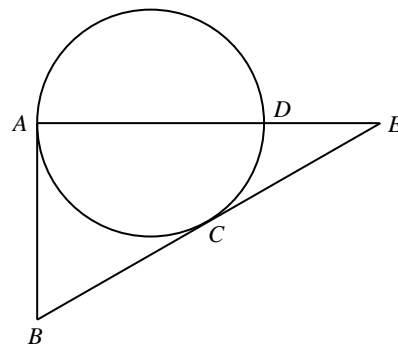


4. In the figure,  $PQ$  is a diameter of the circle.  $AB$  and  $CD$  are tangents to the circle at  $P$  and  $Q$  respectively.  $R$  and  $T$  are points on  $AB$  and  $CD$  respectively such that  $RT$  is the tangent to the circle at  $S$ . It is known that  $\angle DTR = 58^\circ$ .
- (a) Show that  $AB \parallel CD$ .
- (b) Find  $\angle ORT$  and  $\angle ROT$ .



HKDSE Corner

5. In the figure,  $BA$  and  $BC$  are the tangents to the circle at  $A$  and  $C$  respectively.  $AD$  is a diameter of the circle.  $AD$  produced and  $BC$  produced meet at  $E$ . If  $AB = 9$  cm and  $BE = 15$  cm, find  $AD$ .



Try More

6. In the figure,  $PQRS$  is a square of side 14 cm.  $ST$  is the tangent to the semi-circle  $PUQ$  at  $U$ .
- Determine whether  $PS$  and  $QR$  are tangents to the semi-circle  $PUQ$  at  $P$  and  $Q$  respectively.
  - Find the perimeter of  $\triangle TRS$ .
  - Find the area of  $\triangle TRS$ .

