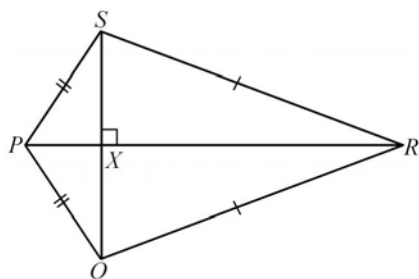


Topic: Congruency Worksheet 1

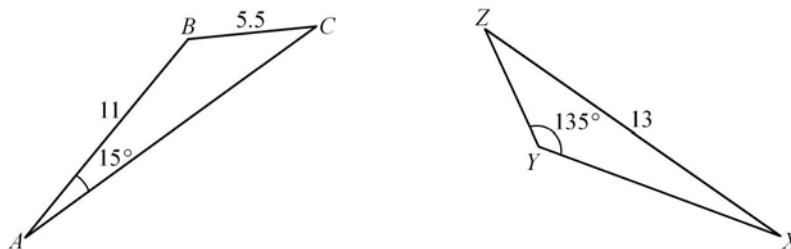
1. A kite $PQRS$ is shown in the diagram. The lines PR and SQ intersect at X .
- How many pairs of congruent triangles can be identified from the diagram?
 - Write down the pairs of congruent triangles identified.



Solution:

- 3 pairs of congruent triangles
- $\Delta SPX \cong \Delta QPX$, $\Delta SRX \cong \Delta QRX$, $\Delta SPR \cong \Delta QPR$

2. In the diagram, ΔABC is congruent to ΔXYZ . The dimensions given are in cm. Find
- the length of AC ,
 - the length of YZ ,
 - $\angle YXZ$,
 - $\angle ACB$.

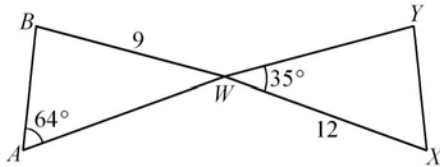


Solution:

- $AC = XZ$
 $= 13 \text{ cm}$
- $YZ = BC$
 $= 5.5 \text{ cm}$
- $\angle YXZ = \angle BAC$
 $= 15^\circ$
- $\angle ABC = \angle XYZ$
 $= 135^\circ$

$$\begin{aligned}\therefore \angle ACB &= 180^\circ - 135^\circ - 15^\circ \text{ (\angle sum of } \Delta) \\ &= 30^\circ\end{aligned}$$

3. In the diagram, the line AY intersects the line BX at W . The dimensions given are in cm. Given that $\triangle ABW$ is congruent to $\triangle XYW$, find
- $\angle WXY$,
 - $\angle ABW$,
 - the length of AY .



Solution:

$$\begin{aligned}\text{(a)} \quad \angle WXY &= \angle WAB \\ &= 64^\circ\end{aligned}$$

(b) Method 1

$$\begin{aligned}\angle XYW &= 180^\circ - 35^\circ - 64^\circ \text{ (\angle sum of } \Delta) \\ &= 81^\circ \\ \therefore \angle ABW &= \angle XYW \\ &= 81^\circ\end{aligned}$$

Method 2

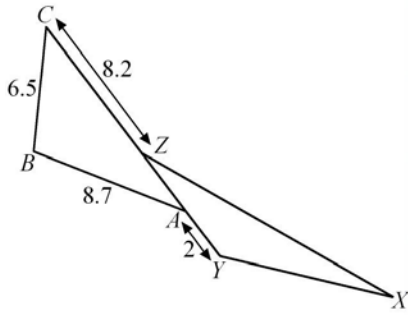
$$\begin{aligned}\angle AWB &= \angle YWX \text{ (vert. opp. } \angle\text{s)} \\ &= 35^\circ \\ \therefore \angle ABW &= 180^\circ - 64^\circ - 35^\circ \text{ (\angle sum of } \Delta) \\ &= 81^\circ\end{aligned}$$

$$\begin{aligned}\text{(c)} \quad AW &= XW \\ &= 12 \text{ cm}\end{aligned}$$

$$\begin{aligned}WY &= WB \\ &= 9 \text{ cm}\end{aligned}$$

$$\begin{aligned}\therefore AY &= AW + WY \\ &= 12 + 9 \\ &= 21 \text{ cm}\end{aligned}$$

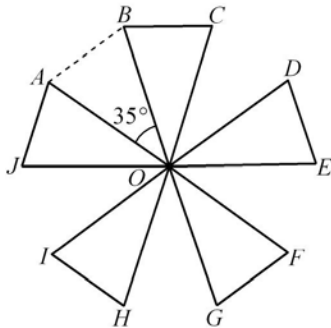
4. In the diagram, $\triangle ABC$ is congruent to $\triangle XYZ$. The dimensions given are in cm. Find the length of
- AZ ,
 - XZ .



Solution:

- (a) $YZ = BC$
 $= 6.5 \text{ cm}$
 $\therefore AZ = YZ - YA$
 $= 6.5 - 2$
 $= 4.5 \text{ cm}$
- (b) $XZ = AC$
 $= AZ + ZC$
 $= 4.5 + 8.2$
 $= 12.7 \text{ cm}$

5. The diagram shows an object made up of 5 congruent metal blades, each in the shape of an isosceles triangle. The metal pieces are spaced out equally and secured at the centre at O and $\angle AOB = 35^\circ$.



- (a) Name a triangle which is congruent to $\triangle AOB$.
- (b) Find
- $\angle BOC$,
 - $\angle ABC$.
- (a) 1.8 m of adhesive tape is used to outline the edges of the object. Find the length of OA if the length of BC is 9 cm.

Solution:

- (a) $\triangle COD$ or $\triangle EOF$ or $\triangle GOH$ or $\triangle IOJ$
- (b) (i) $\angle BOC = \frac{360^\circ - (35^\circ \times 5)}{5}$
 $= 37^\circ$

$$(ii) \quad \angle ABO = \frac{180^\circ - 35^\circ}{2} \text{ (base } \angle\text{s of isos. } \Delta)$$

$$= 72.5^\circ$$

$$\angle CBO = \frac{180^\circ - 37^\circ}{2} \text{ (base } \angle\text{s of isos. } \Delta)$$

$$= 71.5^\circ$$

$$\angle ABC = 71.5^\circ + 72.5^\circ$$

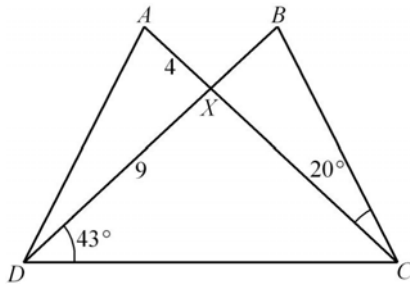
$$= 144^\circ$$

$$(c) \quad OA = \frac{180 - (9 \times 5)}{10}$$

$$= 13.5 \text{ cm}$$

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6. In the diagram, AC and BD intersect at point X , $AX = 4$ cm, $DX = 9$ cm, $\angle BCX = 20^\circ$ and $\angle BDC = 43^\circ$.



- (a) If $\triangle BXC \cong \triangle AXD$, find
- $\angle ADX$,
 - $\angle BXC$,
 - $\angle DAX$,
 - the length of AC .
- (b) State another pair of congruent triangles.

Solution:

(a) (i) $\angle ADX = \angle BCX$
 $= 20^\circ$

(ii) $XC = XD$
 $\angle XDC = \angle XCD$
 $= 43^\circ$

$$\angle BXC = \angle XDC + \angle XCD \text{ (ext. } \angle \text{ of } \Delta)$$

$$= 43^\circ + 43^\circ$$

$$= 86^\circ$$

(iii) $\angle CBX = 180^\circ - 20^\circ - 86^\circ$ (\angle sum of Δ)
 $= 74^\circ$

$$\begin{aligned}\angle DAX &= \angle CBX \\ &= 74^\circ\end{aligned}$$

$$\begin{aligned}\text{(iv)} \quad XC &= XD \\ &= 9 \text{ cm}\end{aligned}$$

$$\begin{aligned}AC &= 4 + 9 \\ &= 13 \text{ cm}\end{aligned}$$

$$\text{(b)} \quad \triangle ADC \equiv \triangle BCD$$
