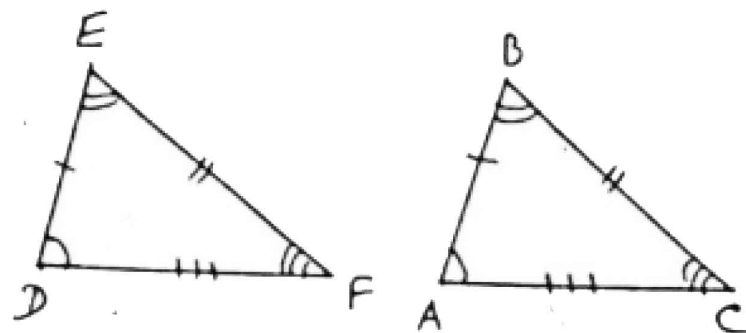


corresponding angles?



$$\overline{AB} \cong \overline{DE}$$

$$\overline{AC} \cong \overline{DF}$$

$$\overline{BC} \cong \overline{FE}$$

$$\angle A \cong \angle D$$

$$\angle B \cong \angle E$$

$$\angle C \cong \angle F$$

8. Are all similar figures congruent? Explain why?

Sol: All similar figures are equal in size and shape.
Therefore, similar figures are congruent.

9. Are all congruent figures similar? Explain why?

Sol: All congruent figures have same shape but differ in size.
Therefore, congruent figures are not similar.

Exercise 7.4

1. Fill in the blanks.

(a) If $\triangle ABC \cong \triangle FDE$, then

(i) $\overline{AB} =$ _____ (ii) $\overline{BC} =$ _____

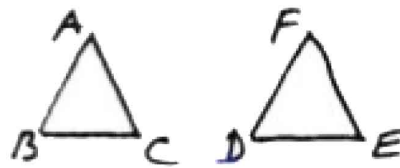
(iii) $\overline{AC} =$ _____ (iv) $m\angle A =$ _____

(v) $m\angle B =$ _____ (vi) $m\angle C =$ _____

(b) In $\triangle PQR$, the angle included between side PR and QR is _____

- (c) In , the side included between $\angle E$ and $\angle F$ is _____
- (d) $\because \overline{AB} = \overline{QP}, m\angle B = m\angle P, \overline{BC} = \overline{PR}$, then by _____
condition. $\triangle ABC \cong \triangle QPR$
- (e) If $m\angle A = m\angle R, m\angle B = m\angle P, \overline{AB} = \overline{RP}$ then by _____
congruence condition. $\triangle ABC \cong \triangle RPQ$

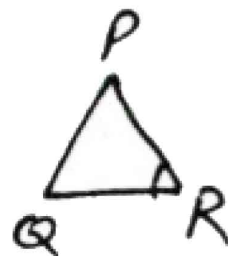
Answers:



(a)

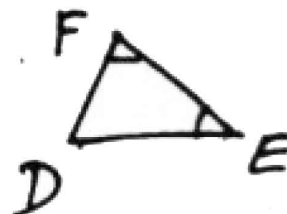
- (i) $\overline{AB} \cong \overline{FD}$ (ii) $\overline{BC} \cong \overline{DE}$
 (iii) $\overline{AC} \cong \overline{FE}$ (iv) $\angle A \cong \angle F$
 (v) $\angle B \cong \angle D$ (vi) $\angle C \cong \angle E$

mid angle $\angle R$



(b)

mid side \overline{FE}

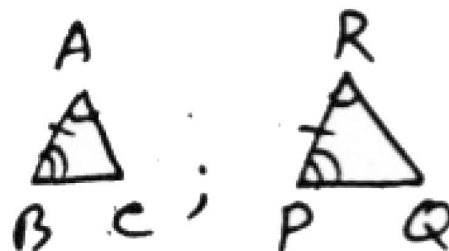


(c)

$$m\angle A = m\angle R$$

$$m\angle B = m\angle P$$

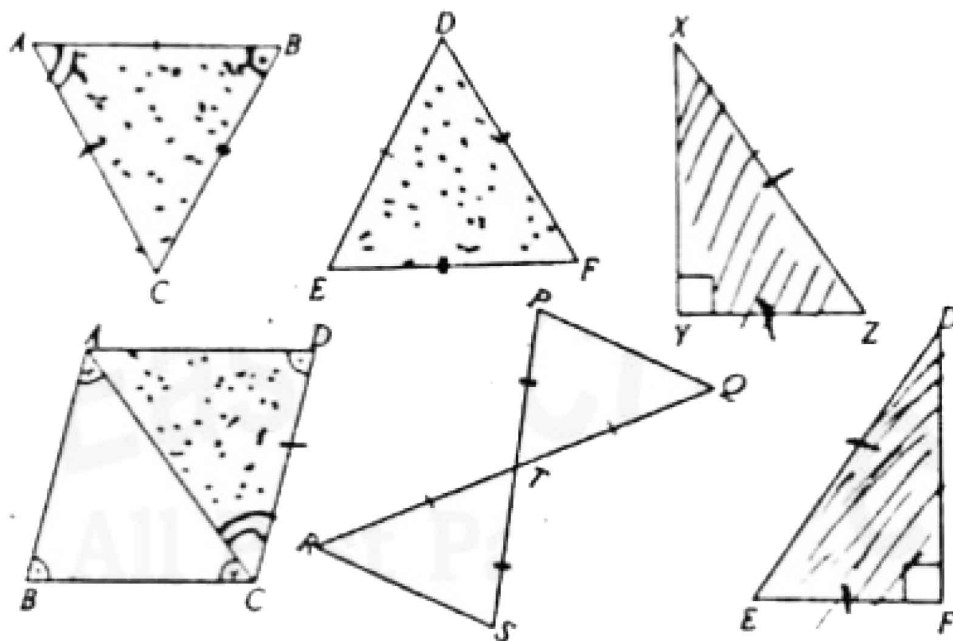
$$\overline{AB} = \overline{RP}$$



(d)

$$\triangle ABC \cong \triangle RPQ \quad \text{ASA} \cong \text{ASA}$$

2. In figure, the pairs of corresponding equal parts in a pair of triangles are shown with similar markings. Specify the two triangles which become congruent. Also, write the congruence of two triangles in symbolic form.



Sol:

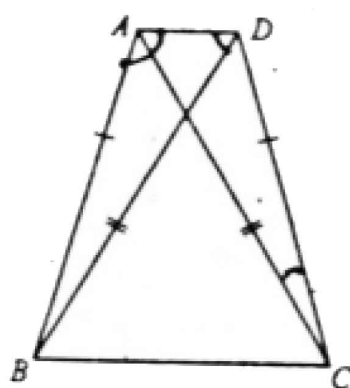
- (i) $\triangle ABC \cong \triangle DEF$ $SSS \cong SSS$
 (ii) $\triangle XYZ \cong \triangle DFE$ $RHS \cong RHS$
 (iii) $\triangle ABC \cong \triangle CDA$ $ASA \cong ASA$
 (iv) $\triangle PQT \cong \triangle SRT$ $SAS \cong SAS$

3. In figure, ABC and DBC are two triangles on a common base \overline{BC} such that $\overline{AB} = \overline{DC}$ and , where A and D lie on the same side of BC . In $\triangle ADB$ and $\triangle DAC$, state the corresponding parts so that $\triangle ADB \cong \triangle DAC$.

Which condition do you use to establish the congruence?

If $m\angle DCA = 40^\circ$ and $m\angle BAD = 100^\circ$,

Find $\angle ADB$.



Sol: Now $\triangle ABC$ and $\triangle DCB$

common $\overline{BC} \cong \overline{CB}$

given $\begin{cases} \overline{AB} \cong \overline{DC} \\ \overline{AC} \cong \overline{DB} \end{cases}$

Now $\triangle ADB$ and $\triangle DAC$

$\overline{DA} \cong \overline{AD}$

$\overline{DB} \cong \overline{AC}$

$\overline{BA} \cong \overline{CD}$

$\triangle ADB \cong \triangle DAC$

SSS \cong SSS

$m\angle DCA = 40^\circ$ now

$m\angle BAD = 100^\circ$ and

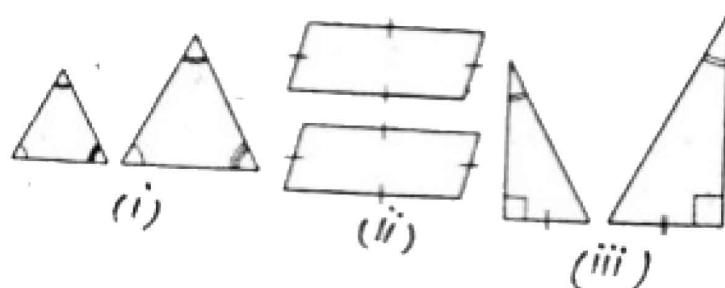
$m\angle ABD = 40^\circ$ therefore

$m\angle ADB = 180^\circ - 100^\circ - 40^\circ$

$= 180^\circ - 140^\circ$

$= 40^\circ$

4. Identify the following figure as congruent, similar or neither.

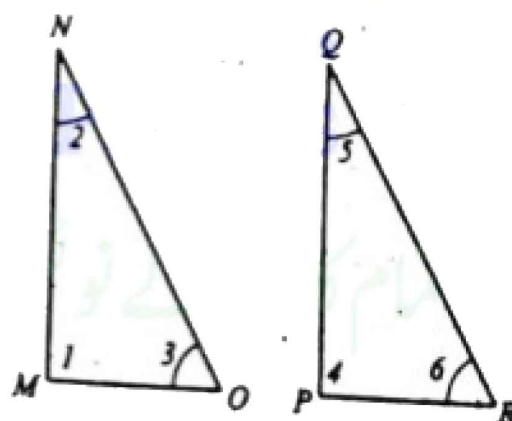


Sol: (i) congruent (ii) congruent
(iii) congruent

No one is similar

5. Identify the corresponding parts in $\triangle MNO$ and $\triangle PQR$.

- (i) $\overline{MN} \leftrightarrow$
(ii) $\overline{NO} \leftrightarrow$
(iii) $\overline{PR} \leftrightarrow$
(iv) \angle \leftrightarrow

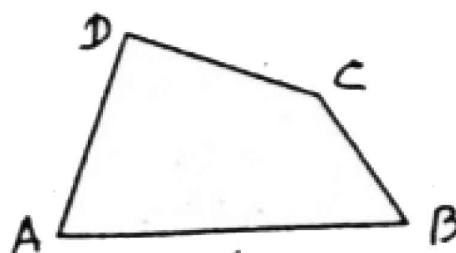


Answers:

- (i) $\overline{MN} \leftrightarrow \overline{PQ}$
(ii) $\overline{NO} \leftrightarrow \overline{QR}$
(iii) $\overline{PR} \leftrightarrow \overline{MO}$
(iv) $\angle 1 \leftrightarrow \angle 4$

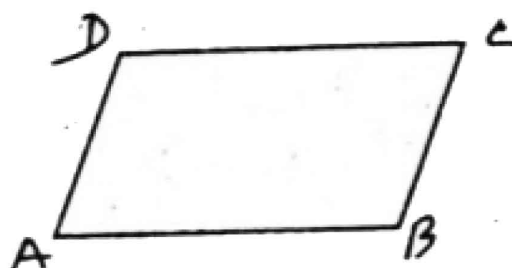
Quadrilaterals:

A quadrilateral is a polygon with four sides.



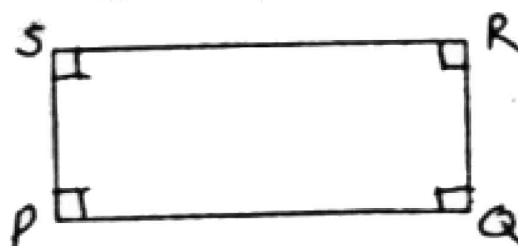
Parallelogram:

A parallelogram is a quadrilateral with two pairs of parallel sides.



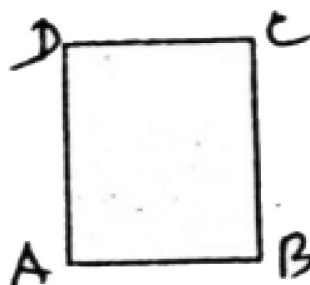
Rectangle

A rectangle is a parallelogram containing a right angle.



Square

A square is an equilateral rectangle.

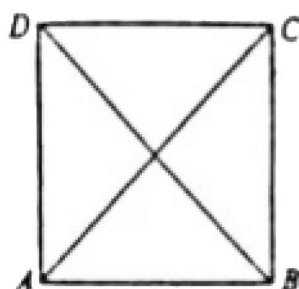


Properties of Congruency

Four Sides of a Square are Equal

ABCD is a square. Measure \overline{AB} , \overline{BC} , \overline{CD} and \overline{DA} . We find that.

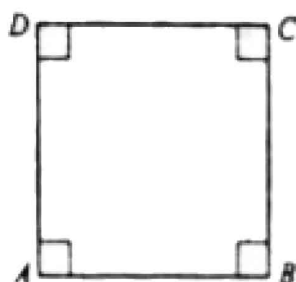
$$m\overline{AB} = m\overline{BC} = m\overline{CD} = m\overline{DA} = 2.8\text{cm.}$$



Four Angles of a Square are Right Angles

ABCD is a square. Measure angle A, B, C, D with protractor. We find that

$$m\angle A = m\angle B = m\angle C = m\angle D = 90^\circ$$

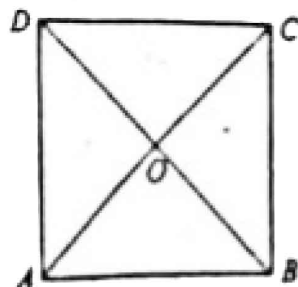


Diagonals of a Square Bisect Each Other:

Consider a square ABCD, the diagonals and intersect at 'O'. We find that

$$m\overline{OA} = m\overline{OC} = 1.9\text{cm and}$$

$$m\overline{OB} = m\overline{OD} = 1.9\text{cm}$$



7.5.2 Opposite Sides of a Rectangle are Equal

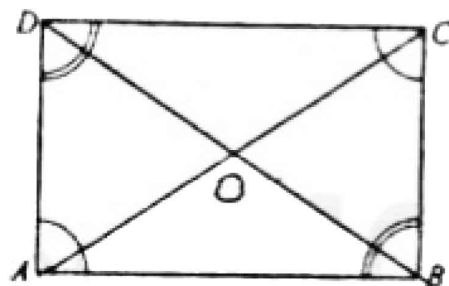
Consider Rectangle

Let us consider a rectangle $ABCD$.

$\overline{AB}, \overline{CD}$ and $\overline{AD}, \overline{BC}$ are opposite pairs of rectangle $ABCD$.

We find that $m\overline{AB} = m\overline{CD} = 4.5\text{cm}$ and

$m\overline{AD} = m\overline{BC} = 2.8\text{cm}$



$$m\overline{AB} = m\overline{DC} \quad (i)$$

$$m\overline{AD} = m\overline{BD} \text{ and}$$

$$m\angle A = m\angle B = m\angle C = m\angle D = 90^\circ \quad (ii)$$

(iii)

$$m\overline{OA} = m\overline{OC},$$

$$m\overline{OB} = m\overline{OD}$$

$$m\overline{OA} = m\overline{OC} = m\overline{OB} = m\overline{OD}$$

Properties of Parallelogram

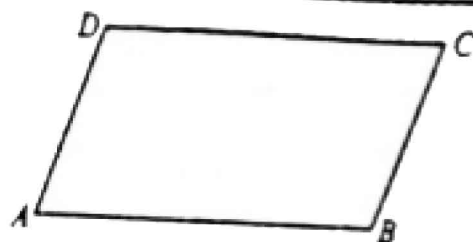
► **The opposite sides of a parallelogram are equal.**

$ABCD$ is a parallelogram. $\overline{AB}, \overline{CD}$ and $\overline{AD}, \overline{BC}$ are pairs of opposite sides.

We find that

$$m\overline{AB} = m\overline{CD} = 3.9\text{cm} \quad \text{and}$$

$$m\overline{AD} = m\overline{BC} = 2.0\text{cm}$$



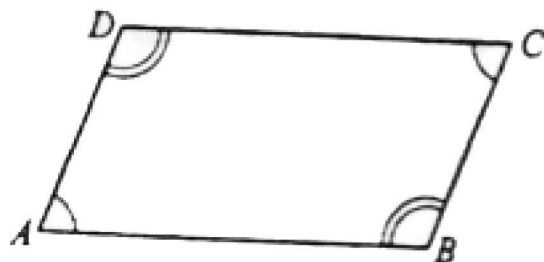
- *The opposite angles of a parallelogram are equal.*

$ABCD$ is a parallelogram. $\angle A, \angle C$ and $\angle B, \angle D$ are pairs of opposite angles.

We find that

$$m\angle A = m\angle C = 70^\circ \text{ and}$$

$$m\angle B = m\angle D = 110^\circ$$



- *The diagonals of a parallelogram bisect each other.*

A parallelogram $ABCD$, the diagonals \overline{AC} and \overline{BD} intersect at O . We find that

$$m\overline{OA} = m\overline{OC} = 2.5\text{cm}$$

and $m\overline{OD} = m\overline{OB} = 2.5\text{cm}$

