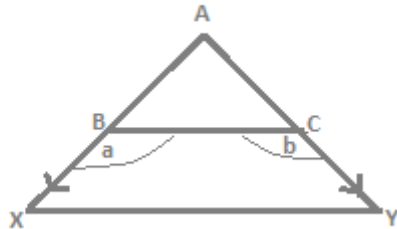




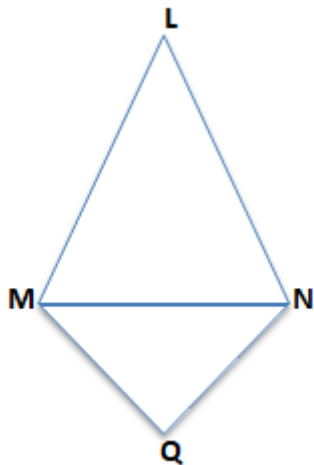
Worksheet-Properties of Isosceles Triangle

1. ABC is an isosceles triangle with $\angle A = 100^\circ$. Find a and b.



2. M is a point on the bisector of $\angle ACB$ of $\triangle ABC$. If the line through M, parallel to AC meets BC at N, prove that CMN is an isosceles triangle.

3.



In the figure, LMN and QMN are two isosceles triangles on the same base MN. Then:

- a. $\angle LMN = \angle LNQ$
- b. $\angle LMN > \angle LNQ$
- c. $\angle LMN < \angle LNQ$
- d. None of the above

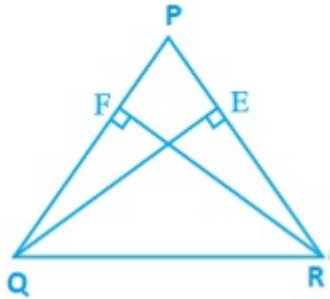
4. If the bisector of the angle B of $\triangle BAC$ is perpendicular to the base AC of the triangle then what type of triangle is BAC?

5. Point O is the incentre of isosceles triangle XYZ. Show that $OX = OY$.



Worksheet-Properties of Isosceles Triangle

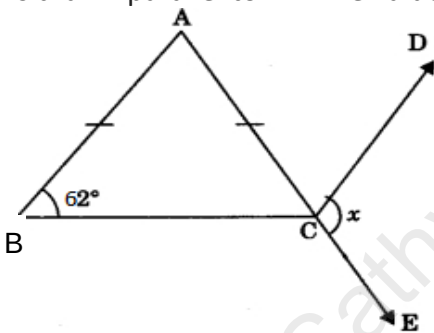
6. PQR is an isosceles triangle in which altitudes QE and RF are drawn on equal sides PR and PQ respectively. Show that $QE = RF$.



7. ABC is an isosceles triangle in which medians BE and CF are drawn to equal sides AC and AB respectively. Then triangles BCF and CBE are congruent by:

- a) SAS rule
- b) ASA rule
- c) They are not congruent

8. In the given figure, ΔABC is isosceles. Side AC is produced to E and through C, CD is drawn parallel to BA. The value of x is:



- a. 52°
- b. 156°
- c. 76°
- d. 124°

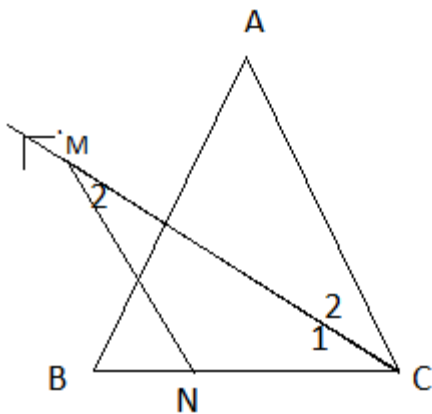


Worksheet-Properties of Isosceles Triangle

Hints /Answers:

1. Angles a, b are 140° each. $\angle B = \angle C = 40^\circ$ (Using Isosceles triangle and angle sum property of triangle). Find a,b using linear pair axiom.

2.



$\angle ACM = \angle BCM$ (CM is angle bisector of $\angle ACB$) ----- (i)

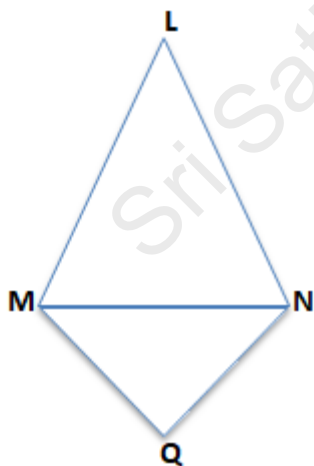
$\angle NMC = \angle ACM$ (alternate angles) ----- (ii)

From i and ii

$\angle BCM$ or $\angle NCM = \angle NMC$

Hence $NM = NC$ (side opposite to equal angles are equal)

3.



$\angle LMN = \angle LNM$ ----- (i) (Isosceles triangle theorem)

$\angle QMN = \angle QNM$ ----- (ii) (Isosceles triangle theorem)

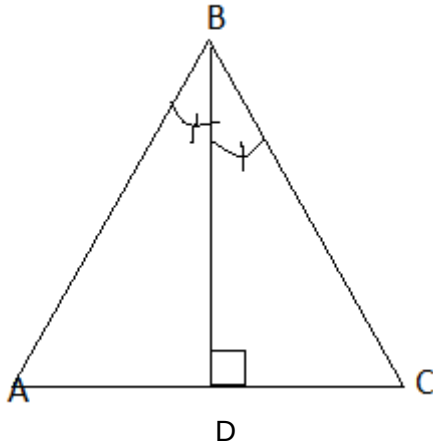


Worksheet-Properties of Isosceles Triangle

From i +ii

$$\angle LMQ = \angle LNQ$$

4.



ABC is isosceles triangle

In $\triangle BAD$ and $\triangle BCD$, $\angle ABD = \angle CBD$ (BD is the bisector of $\angle ABC$)

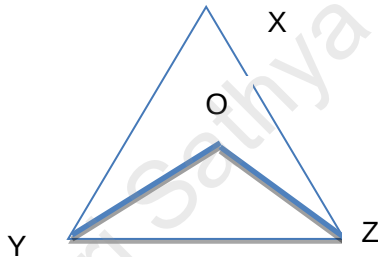
$$BD = BD \text{ and } \angle BDA = \angle BDC = 90^\circ$$

$\triangle BAD \cong \triangle BCD$ (by ASA rule)

Thus, $BA = BC$. $\triangle ABC$ is isosceles triangle.

Note that, if same thing is true from all three vertices, then $\triangle ABC$ is equilateral.

5. Incentre is the point of intersection of angle bisectors.



YO and ZO are angle bisectors of angles Y and Z.

$$\angle Y = \angle Z \text{ (because } XY = XZ \text{)}$$

$$\frac{1}{2}(\angle Y) = \frac{1}{2}(\angle Z)$$

$$\angle OYZ = \angle OZY$$

Therefore $OY = OZ$ (converse of isosceles triangle theorem)

6. Given $\triangle PQR$ is isosceles ($PQ = PR$)

To Prove: $QE = RF$

In $\triangle QRE$ and $\triangle RQF$

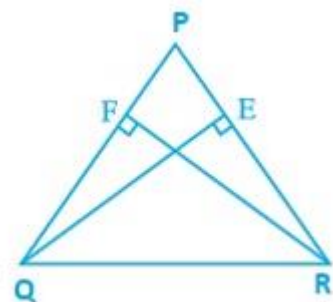
$$\angle Q = \angle R \text{ (Angles opposite to equal sides of } \triangle PQR \text{)}$$

$$QR = RQ \text{ (Common)}$$

$$\angle REQ = \angle QFR = 90^\circ \text{ (Given)}$$

Hence by AAS, Triangles are congruent.

$$QE = RF \text{ (CPCT)}$$



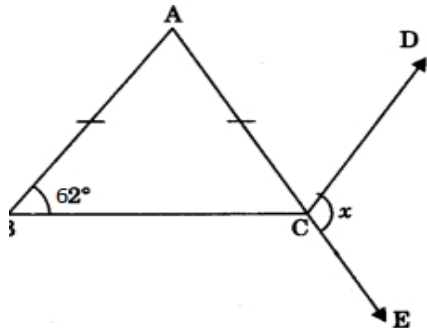


Worksheet-Properties of Isosceles Triangle



7. a. SAS rule (Use median property and isosceles triangle property)

8.



In $\triangle ABC$, $\angle C = 62^\circ$. ($\triangle ABC$ is isosceles)

$$\angle A = 180^\circ - 62^\circ - 62^\circ = 56^\circ$$

$$\angle ACD = \angle A = 56^\circ.$$

$$x + \angle ACD = 180^\circ$$

$$x = 180^\circ - \angle ACD = 180^\circ - 56^\circ = 124^\circ.$$