

Miscellaneous Questions

Questions:

Below are given the measures of certain sides and angles of triangles. Identify those which cannot be constructed and say why you cannot construct them. Construct rest of the triangle.

Triangle	Given measurements		
1. $\triangle ABC$	$m\angle A = 85^\circ$;	$m\angle B = 115^\circ$;	$AB = 5$ cm
2. $\triangle PQR$	$m\angle Q = 30^\circ$;	$m\angle R = 60^\circ$;	$QR = 4.7$ cm
3. $\triangle ABC$	$m\angle A = 70^\circ$;	$m\angle B = 50^\circ$;	$AC = 3$ cm
4. $\triangle LMN$	$m\angle L = 60^\circ$;	$m\angle N = 120^\circ$;	$LM = 5$ cm
5. $\triangle ABC$	$BC = 2$ cm;	$AB = 4$ cm;	$AC = 2$ cm
6. $\triangle PQR$	$PQ = 3.5$ cm;	$QR = 4$ cm;	$PR = 3.5$ cm
7. $\triangle XYZ$	$XY = 3$ cm;	$YZ = 4$ cm;	$XZ = 5$ cm
8. $\triangle DEF$	$DE = 4.5$ cm;	$EF = 5.5$ cm;	$DF = 4$ cm

Answer 1:

In $\triangle ABC$, $m\angle A = 85^\circ$, $m\angle B = 115^\circ$, $AB = 5$ cm

Construction of $\triangle ABC$ is not possible because $m\angle A = 85^\circ + m\angle B = 200^\circ$, and we know that the sum of angles of a triangle should be 180° .

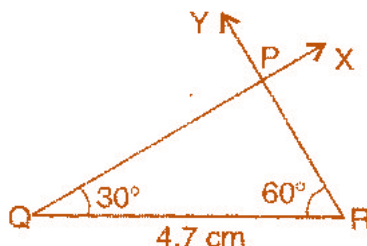
Answer 2:

To construct: $\triangle PQR$ where $m\angle Q = 30^\circ$, $m\angle R = 60^\circ$ and $QR = 4.7$ cm.

Steps of construction:

- Draw a line segment $QR = 4.7$ cm.
- At point Q, draw $\angle XQR = 30^\circ$ with the help of compass.
- At point R, draw $\angle YRQ = 60^\circ$ with the help of compass.
- QX and RY intersect at point P.

It is the required triangle PQR.



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Answer 3:

We know that the sum of angles of a triangle is 180° .

$$\therefore m\angle A + m\angle B + m\angle C = 180^\circ$$

$$\Rightarrow 70^\circ + 50^\circ + m\angle C = 180^\circ$$

$$\Rightarrow 120^\circ + m\angle C = 180^\circ$$

$$\Rightarrow m\angle C = 180^\circ - 120^\circ$$

$$\Rightarrow m\angle C = 60^\circ$$

To construct: $\triangle ABC$ where $m\angle A = 70^\circ$, $m\angle C = 60^\circ$ and $AC = 3$ cm.

Steps of construction:

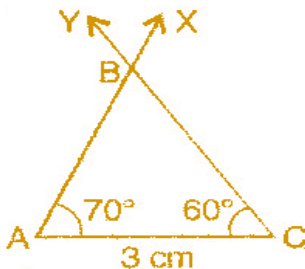
(a) Draw a line segment $AC = 3$ cm.

(b) At point C, draw $\angle YCA = 60^\circ$.

(c) At point A, draw $\angle XAC = 70^\circ$.

(d) Rays XA and YC intersect at point B

It is the required triangle ABC.



Answer 4:

In $\triangle LMN$, $m\angle L = 60^\circ$, $m\angle N = 120^\circ$, $LM = 5$ cm

This $\triangle LMN$ is not possible to construct because $m\angle L + m\angle N = 60^\circ + 120^\circ = 180^\circ$ which forms a linear pair.

Answer 5:

$\triangle ABC$, $BC = 2$ cm, $AB = 4$ cm and $AC = 2$ cm

This $\triangle ABC$ is not possible to construct because the condition is

Sum of lengths of two sides of a triangle should be greater than the third side.

$$AB < BC + AC$$

$$\Rightarrow 4 < 2 + 2$$

$$\Rightarrow 4 = 4,$$

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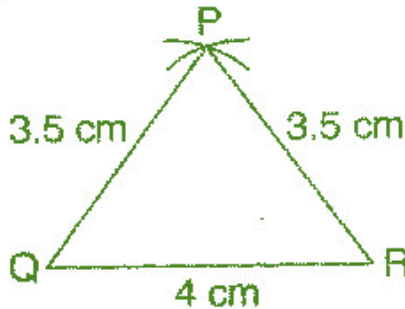
Answer 6:

To construct: $\triangle PQR$ where $PQ = 3.5$ cm, $QR = 4$ cm and $PR = 3.5$ cm

Steps of construction:

- (a) Draw a line segment $QR = 4$ cm.
- (b) Taking Q as centre and radius 3.5 cm, draw an arc.
- (c) Similarly, taking R as centre and radius 3.5 cm, draw an another arc which intersects the first arc at point P .

It is the required triangle PQR .



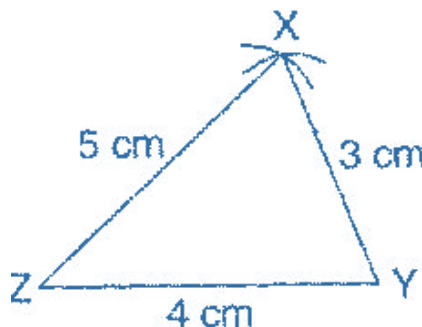
Answer 7:

To construct: A triangle whose sides are $XY = 3$ cm, $YZ = 4$ cm and $XZ = 5$ cm.

Steps of construction:

- (a) Draw a line segment $ZY = 4$ cm.
- (b) Taking Z as centre and radius 5 cm, draw an arc.
- (c) Taking Y as centre and radius 3 cm, draw another arc.
- (d) Both arcs intersect at point X .

It is the required triangle XYZ .



Answer 8:

To construct:

A triangle DEF whose sides are $DE = 4.5$ cm, $EF = 5.5$ cm and $DF = 4$ cm.

Steps of construction:

(a) Draw a line segment $EF = 5.5$ cm.

(b) Taking E as centre and radius 4.5 cm, draw an arc.

(c) Taking F as centre and radius 4 cm, draw an another arc which intersects the first arc at point D.

It is the required triangle DEF.

