Q1. Draw a line segment of length 8.6cm. Bisect it and measure the length of each part.
Steps of construction:
1. Draw a line segment AB of 8.6cm.
2. Keeping A as center and radius more than half of AB draw arcs on each side of AB.
3. Keeping B as center and the same radius draw arcs on each side of AB cutting the previous arcs at P and Q respectively.
4. Join the points P and Q which intersects AB at C.

Therefore AC= BC= 4.3cm

Q2. Draw a line segment AB of length 5.8cm. Draw the perpendicular bisector of this line segment.

Steps of construction:
1. Draw a line segment AB of 5.8cm.
2. Keeping A as center and radius more than half of AB draw arcs on each side of AB.
3. Keeping B as center and the same radius draw arcs on each side of AB cutting the previous arcs at P and Q respectively.
4. Join the points P and Q.

Hence PQ is the perpendicular bisector of AB

Q3. Draw a circle with center at point O and radius 5cm. Draw its chord AB, the perpendicular bisector of line segment AB. Does it pass through the center of the circle?
Steps of construction:
1. Keeping O as center and radius as 5cm draw a circle.
2. Draw a chord AB.
3. Keeping A as center and radius more than half of AB draw arcs one on each side of chord AB.
4. Keeping B as center and the same radius draw arcs cutting the previous arcs at points P and Q respectively.
5. Join the points P and Q.
Therefore the perpendicular bisector PQ of chord AB passes through the center of the circle.

Q4. Draw a circle with center at point O. Draw its two chords AB and CD such that AB is not parallel to CD. Draw the perpendicular bisectors of AB and CD. At what point do they intersect?

Steps of construction:
1. Keeping O as the centre and any radius draw a circle.
2. Draw two chords AB and CD.
3. Keeping A as center and radius more than half of AB draw arcs, one on each side of AB.
4. Keeping B as center and the same radius draw arcs cutting the previous arcs at point P and Q respectively.
5. Join the points P and Q.
6. Keeping D as center and radius more than half of DC draw arcs, one on each side of DC.
7. Keeping C as center and the same radius draw arcs cutting the previous arcs at points R and S respectively.
8. Join the points R and S.
Both the perpendicular bisectors PQ and RS intersect each other at the center O of the circle.

Q5. Draw a line segment of length 10cm and bisect it. Further, bisect one of the equal parts and measure its length.
Steps of construction:

1. Draw a line segment AB of length 10cms.
2. Keeping A as center and radius more than half of AB draw arcs one on each side of AB.
3. Keeping B as center and same radius draw arcs cutting the previous arc at point P and Q respectively.
4. Join P and Q which intersects AB at C.
5. Keeping A as center and radius more than half of AC draw arcs on each side of AC.
6. Keeping C as center and the same radius draw arcs cutting the previous arcs at points R and S respectively.
7. Join points R and S which intersects AC at D.

Therefore AD = 2.5cm

Q6. Draw a line segment AB bisect it. Bisect one of the equal parts to obtain a line segment of length \( \frac{1}{4} (AB) \).

Steps of construction:

1. Draw a line segment AB.
2. With A as center and radius more than half of AB draw arcs, one on each side of AB.
3. With B as the center and same radius draw arcs cutting the previous arcs at points P and Q respectively.
4. Join P and Q which intersects AB at C.
5. With A as center and radius more than half of AC draw arcs, one on each side of AC.
6. With C as the center and same radius draw arcs cutting the previous arcs at R and S respectively.
7. Join points R and S which intersects AC at D.

Therefore AD = \( \frac{1}{4} (AB) \)

Q7. Draw a line segment AB and by ruler and compasses, obtain a line segment of length \( \frac{3}{4} (AB) \).

Steps of construction:

1. Draw a line segment AB.
2. With A as center and radius more than half of AB draw arcs, one on each side of AB.
3. With B as the center and same radius draw arcs cutting the previous arcs at points P and Q respectively.
4. Join P and Q which intersects AB at C.
5. With A as center and radius more than half of AC draw arcs, one on each side of AC.
6. With C as the center and same radius draw arcs cutting the previous arcs at R and S respectively.
7. Join points R and S which intersects AC at D.

Therefore AD = \frac{3}{4} \cdot (AB)
Q1. Draw an angle and label it as [Math Processing Error]. Construct another angle, equal to [Math Processing Error]
1. Draw an angle ABC and a line segment QR.
2. With center A and any radius, draw an arc which intersects at E and D.
3. With Q as a centre and same radius draw an arc which intersects QR at S.
4. With S as center and radius equal to DE, draw an arc which intersects the previous arc at T.
5. Draw a line segment joining Q and T.

Therefore \[ \angle DAE = \angle DAQ \]

Q2. Draw an obtuse angle. Bisect it. Measure each of the angles so formed.

Steps of construction:
1. Draw an angle \[ \angle ABC \] of \[ \text{Math Processing Error} \].
2. With B as a centre and any radius, draw an arc which intersects AB at P and BC at Q.
3. With P as center and radius more than half of PQ draw an arc.
4. With Q as a center and same radius draw an arc which cuts the previous arc at R.
5. Join BR.

Therefore \[ \angle APB = \angle ARB = \frac{1}{2} \angle ABC \]

Q3. Using your protractor, draw an angle of \[ \text{Math Processing Error} \]. With this given angle as given, draw an angle of \[ \text{Math Processing Error} \].
Steps of construction:

1. Draw an angle ABC of $\angle \mathbf{Z}$.
2. With B as the center and any radius draw an arc which intersects AB at P and BC at Q.
3. With P as center and radius more than half of PQ draw an arc.
4. With Q as the centre and same radius draw an arc which intersects the previous arc at R.
5. Join BR.

Therefore $\angle \mathbf{Z} = \angle \mathbf{Z}$

Q4. Using the protractor, draw a right angle. Bisect it to get an angle of measure $\angle \mathbf{Z}$.

Steps of construction:

1. Draw an angle ABC of $\angle \mathbf{Z}$.
2. With B as the centre and any radius draw an arc which intersects AB at P and BC at Q.
3. With P as center and radius more than half of PQ draw an arc.
4. With Q as center and same radius draw an arc which intersects the previous arc at R.
5. Join BR.

Therefore $\angle \mathbf{Z} = \angle \mathbf{Z}$

Q5. Draw a linear pair of angles. Bisect each of the two angles. Verify that the two bisecting rays are perpendicular to each other.
Steps of construction:

1. Draw two angles DCA and DOB forming linear pair
2. With center C and any radius draw an arc which intersects AC at P and CD at Q and CB at R
3. With center P and Q and any radius draw two arcs which intersect each other at S
4. Join SC
5. With Q and R as center and any radius draw two arcs which intersect each other at T
6. Join TC

Therefore \[ \text{[Math Processing Error]} = \text{[Math Processing Error]} \].

Q6. Draw a pair of vertically opposite angles. Bisect each of the two angles. Verify that the bisecting rays are in the same line.

Steps of Construction:

1. Draw a pair of vertically opposite angle \[ \text{[Math Processing Error]} \] and \[ \text{[Math Processing Error]} \].
2. Keeping O as the center and any radius draw two arcs which intersect OA at P, OC at Q, OB at S and OD at R.
3. Keeping P and Q as center and radius more than half of PQ draw two arcs which intersect each other at T.
4. Join TO.
5. Keeping R and S as center and radius more than half of RS draw two arcs which intersect each other at U.
6. Join OU.

Therefore TOU is a straight line.

Q7. Using rulers and compasses only, draw a right angle.

Steps of construction:
1. Draw a line segment AB.
2. Keeping A as the center and any radius draw an arc which intersects AB at C.
3. Keeping C as center and the same radius draw an arc which intersects the previous arc at D.
4. Keeping D as the center and same radius draw an arc which intersects arc in (2) at E.
5. Keeping E and D as center and radius more than half of ED draw arcs which intersect each other at F.
6. Join FA.

Therefore \[ \text{Math Processing Error} = \text{Math Processing Error} \]

Q8. Using rulers and compasses only, draw an angle of measure \[ \text{Math Processing Error} \].

**Steps of construction:**

1. Draw a line segment AB and produce BA to C.
2. Keeping A as the center and any radius draw an arc which intersects AC at D and AB at E.
3. Keeping D and E as center and radius more than half of DE draw arcs which intersect each other at F.
4. Join FA which intersects the arc in (2) at G.
5. Keeping G and D as center and radius more than half of GD draw arcs which intersect each other at H.
6. Join HA.

Therefore \[ \text{Math Processing Error} = \text{Math Processing Error} \]

Q9. Using a protractor, draw an angle of measure \[ \text{Math Processing Error} \]. With this angle as given draw angles of measure \[ \text{Math Processing Error} \] and \[ \text{Math Processing Error} \].

**Steps of construction:**

1. Draw an \[ \text{Math Processing Error} \] of \[ \text{Math Processing Error} \] with the help of a protractor.
2. Keeping B as center and any radius draw an arc which intersects AB at D and BC at E.
3. Keeping D and E as center and radius more than half of DE draw two arcs which intersect each other at F.
4. Join FB which intersects the arc in (2) at G.
5. Keeping D and G as center and radius more than half of DG draw two arcs which intersect each other at H
6. Join HB

Therefore \[ \text{Math Processing Error} = \text{Math Processing Error} \]

\[ \text{Math Processing Error} = \text{Math Processing Error} \]

Q10. Construct the following angles at the initial point of a given ray and justify the construction:

1. \[ \text{Math Processing Error} \]
2. \[ \text{Math Processing Error} \]

Answers

1. \[ \text{Math Processing Error} \]
2. \[ \text{Math Processing Error} \]

Steps of construction:

1. Draw a line segment AB and produce BA to C.
2. Keeping A as the center and any radius draw an arc which intersects AC at D and AB at E.
3. Keeping D and E as center and radius more than half of DE draw arcs which intersect each other at F.
4. Join FA which intersects the arc in (2) at G.
5. Keeping G and E as center and radius more than half of GE draw arcs which intersect each other at H.
6. Join HA.

Therefore \[ \text{Math Processing Error} = \text{Math Processing Error} \]

2. \[ \text{Math Processing Error} \]

Steps of construction:

1. Draw a line segment AB.
2. Keeping A as the center and any radius draw an arc which intersects AB at C.
3. Keeping C as center and the same radius draw an arc which intersects the previous arc at D.
4. Keeping D as the center and same radius draw an arc which intersects arc in (2) at E.
5. Keeping E and D as center and radius more than half of ED draw arcs which intersect each other at F.
6. Join FA.

Therefore \[ \text{Math Processing Error} \]

Q11. Construct the angles of the following measurements:

1. \[ \text{Math Processing Error} \]
2. \[ \text{Math Processing Error} \]
3. \[ \text{Math Processing Error} \]
4. \[ \text{Math Processing Error} \]
5. \[ \text{Math Processing Error} \]
6. \[ \text{Math Processing Error} \]

ANSWERS:

1. \[ \text{Math Processing Error} \]

Steps of construction:

1. Draw a line segment AB.
2. Keeping A as the centre and any radius draw an arc which intersects AB at C.
3. Keeping C as center and the same radius draw an arc which intersects the previous arc at D.
4. Keeping D and C as center and radius more than half of DC draw arcs which intersect each other at E.
5. Join EA.

Therefore \[ \text{Math Processing Error} \]
Steps of construction:

1. Draw a line segment AB.
2. Keeping A as the center and any radius draw an arc which intersects AB at C.
3. Keeping C as center and the same radius draw an arc which intersects the previous arc at D.
4. Keeping D as the centre and same radius draw an arc which intersects arc in (2) at E.
5. Keeping E and D as center and radius more than half of ED draw arcs intersecting each other at F.
6. Join FA which intersects arc in (2) at G.
7. Keeping G and D as center and radius more than half of GD draw arcs intersecting each other at H.
8. Join HA.

Therefore \[ \text{[Math Processing Error]} \]

Steps of construction:

1. Draw a line segment AB.
2. Keeping A as the center and any radius draw an arc which intersects AB at C.
3. Keeping C as center and the same radius draw an arc which intersects the previous arc at D.
4. Keeping D as the centre and same radius draw an arc which intersects arc in (2) at E.
5. Keeping E and D as center and radius more than half of ED draw arcs intersecting each other at F.
6. Join FA which intersects arc in (2) at G.
7. Keeping E and G as center and radius more than half of EG draw arcs which intersect each other at H.
8. Join HA.

Therefore \[ \text{[Math Processing Error]} \]

4. \[ \text{[Math Processing Error]} \]
Steps of construction:

1. Draw a line segment AB and produce BA to C.
2. Keeping A as the center and any radius draw an arc which intersects AC at D and AB at E.
3. Keeping D and E as center and radius more than half of DE draw arcs which intersect each other at F.
4. Join FA which intersects the arc in (2) at G.
5. Keeping G and D as center and radius more than half of GD draw arcs which intersect each other at H.
6. Join HA.

Therefore $\angle HAF = \angle GAD$. 

5. $\angle HAF = \angle GAD$. 

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Steps of construction:

1. Draw a line segment AB.
2. Keeping A as the center and any radius draw an arc which intersects AB at C.
3. Keeping C as center and the same radius draw an arc which intersects the previous arc at D.
4. Keeping D and C as center and radius more than half of DC draw arcs which intersect each other at E.
5. Join EA which intersects arc in (2) at F.
6. Keeping F and C as center and radius more than half of FC draw arcs which intersect each other at G.
7. Join GA.

Therefore $\angle HAF = \angle GAD$. 

6. $\angle HAF = \angle GAD$. 
Steps of construction:

1. Draw a line segment AB.
2. Keeping A as the center and any radius draw an arc which intersects AB at C.
3. Keeping C as center and the same radius draw an arc which intersects the previous arc at D.
4. Keeping D as the center and same radius draw an arc which intersects arc in (2) at E.
5. Keeping E and D as center and radius more than half of ED draw arcs which intersect each at F.
6. Join FA which intersects arc in (2) at G.
7. Keeping G and C as center and radius more than half of GC draw arcs intersecting each other at point H.
8. Join HA which intersects the arc in (2) at a point I.
9. Keeping I and C as center and radius more than half of IC draw arcs intersecting each other at point J.
10. Join JA.

Therefore \[ \text{Math Processing Error} \] = \[ \text{Math Processing Error} \]
Q1. Construct a \( \triangle ABC \) in which \( BC = 3.6 \text{cm} \), \( AB + AC = 4.8 \text{cm} \) and \( \angle B = 60^0 \).
Steps of Construction:

1. Construct a line segment BC of 3.6 cm.
2. At the point B, draw $\angle XBC = 60^\circ$.
3. Keeping B as center and radius 4.8 cm draw an arc which intersects XB at D.
4. Join DC.
5. Draw the perpendicular bisector of DC which intersects DB at A.
6. Join AC.

Hence $\triangle ABC$ is the required triangle.

Q2. Construct a $\triangle ABC$ in which $AB + AC = 5.6$ cm, $BC = 4.5$ cm and $\angle B = 45^\circ$.

Steps of Construction:

1. Construct a line segment BC of 4.5 cm.
2. At the point B, draw $\angle XBC = 45^\circ$.
3. Keeping B as centre and radius 5.6 cm draw an arc which intersects XB at D.
4. Join DC.
5. Draw the perpendicular bisector of DC which intersects DB at A.
6. Join AC.

Hence $\triangle ABC$ is the required triangle.

Q3. Construct a $\triangle ABC$ in which $BC = 3.4$ cm, $AB - AC = 1.5$ cm and $\angle B = 45^\circ$. 
Steps of Construction:

1. Construct a line segment BC of 3.4cm.
2. At the point B, draw $\angle XBC = 45^\circ$.
3. Keeping B as centre and radius 1.5cm draw an arc which intersects XB at D.
4. Join DC.
5. Draw the perpendicular bisector of DC which intersects DB at A.
6. Join AC.
Hence $\triangle ABC$ is the required triangle.

Q4. Using rulers and compasses only, construct a $\triangle ABC$, given base BC=7cm, $\angle ABC = 60^\circ AB+AC=12cm$.

Steps of Construction:

1. Construct a line segment BC of 7cm
2. At the point B, draw $\angle XBC = 60^\circ$.
3. Keeping B as center and radius 12cm draw an arc which intersects XB at D
4. Join DC
5. Draw the perpendicular bisector of DC which intersects DB at A
6. Join AC
Hence $\triangle ABC$ is the required triangle.

Q5. Construct a triangle whose perimeter is 6.4cm, and angles at the base are $60^\circ$ $45^\circ$. 
Steps of Construction:

1. Draw a line segment XY of 6.4cm.
2. Draw $\angle DXY = 60^\circ$ and $\angle EYX = 45^\circ$.
3. Draw the angle bisectors of $\angle DXY$ and $\angle EYX$ which intersect each other at A.
4. Draw the perpendicular bisector of AX and AY which intersect XY at B and C respectively.
5. Join AB and AC.

Hence $\triangle ABC$ is the required triangle.

Q6. Using rulers and compasses only, construct a $\triangle ABC$ from the following data:

$AB + BC + CA = 12\text{cm}$, $\angle B = 45^\circ$ and $\angle C = 60^\circ$

Steps of Construction:

1. Draw a line segment XY of 12cm.
2. Draw $\angle DXY = 45^\circ$ and $\angle EYX = 60^\circ$.
3. Draw the angle bisectors of $\angle DXY$ and $\angle EYX$ which intersect each other at A.
4. Draw the perpendicular bisector of AX and AY which intersect XY at B and C respectively.
5. Join AB and AC.

Hence $\triangle ABC$ is the required triangle.

Q7. Construct a right-angled triangle whose perimeter is equal to 10cm and one acute angle equal to $60^\circ$.
**Steps of Construction:**

1. Draw a line segment $XY$ of 10cm.
2. Draw $\angle DXY = 90^\circ$ and $\angle EYX = 60^\circ$.
3. Draw the angle bisectors of $\angle DXY$ and $\angle EYX$ which intersect each other at $A$.
4. Draw the perpendicular bisector of $AX$ and $AY$ which intersect $XY$ at $B$ and $C$ respectively.
5. Join $AB$ and $AC$.

Hence $\triangle ABC$ is the required triangle.

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**Q8. Construct a triangle $ABC$ such that $BC= 6cm$, $AB= 6cm$ and median $AD=4cm$.**

**Steps of construction:**

1. Draw a line segment $BC$ of 6cm.
2. Take mid-point $O$ of side $BC$.
3. With center $B$ and $D$ and radii 6cm and 4cm, draw two arcs which intersect each other at $A$.
4. Join $AB$, $AD$ and $AC$.

Hence $\triangle ABC$ is the required triangle.

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**Q9. Construct a right-angled triangle $ABC$ whose base $BC$ is 6cm and the sum of the hypotenuse $AC$ and other side $AB$ is 10cm.**

**Steps of Construction:**

1. Construct a line segment $BC$ of 6cm.
2. At the point $B$, draw $\angle XBC = 90^\circ$.
3. Keeping $B$ as center and radius 10cm draw an arc which intersects $XB$ at $D$.
4. Join $DC$.
5. Draw the perpendicular bisector of $DC$ which intersects $DB$ at $A$. 
6. Join AC.

Hence \( \triangle ABC \) is the required triangle.

Q10. Construct a triangle XYZ in which \( \angle Y = 30^\circ \), \( \angle Z = 90^\circ \) and \( XY + YZ + ZX = 11 \text{ cm} \).

Steps of construction:

1. Draw a line segment AB of 11 cm.
2. Draw \( \angle DAB = 30^\circ \) and \( \angle FBA = 90^\circ \).
3. Draw the angle bisectors of \( \angle DAB \) and \( \angle EBA \) which intersect each other at X.
4. Draw the perpendicular bisector of XA and XB which intersect AB at Y and Z respectively.
5. Join XY and XZ.

Hence \( \triangle XYZ \) is the required triangle.