13. Construction: (Construction of a Parallelogram whose measurement of one angle is given and equal in area of a triangle)

Let us do 13

1. Question

We draw a line segment PQ of length 5 cm. We take an external point A of line segment. Let us draw parallel line through the point A to line segment PQ. [Let us draw three alternative process]

Answer

Method 1:

Steps of construction:

- 1. We draw a line segment PQ of length 5cm.
- 2. We take an external point A of line segment.



3. Draw an arc from A that intersects PQ at two different points B and C.



4. Draw perpendicular bisector of BC. It passes through A.



5. Draw perpendicular of this line through A.



6. This line is parallel to PQ.

Method 2:

Steps of Construction:

- 1. We draw a line segment PQ of length 5cm.
- 2. We take an external point A of line segment.



4. Mark it as B.

^{3.} Draw a bigger arc from A cutting PQ at a point.



5. With the same radius and B as center, draw another arc on PQ as C.



6.From C, with the same radius draw another arc cutting the first arc at D.



7. Join D to A and extend the line.



8. This line is parallel to PQ.

Method 3:

Steps of Construction:

1. We draw a line segment PQ of length 5cm.

2. We take an external point A of line segment.

A







5. The corresponding drawn line is parallel to PQ.

2. Question

We draw a triangle with length of sides 5 cm, 8 cm and 11 cm and draw a parallelogram equal in area to that triangle and having an angle 60°. [Let us write instruction process and proof]

Answer

Steps of Construction:

1. We draw a triangle ABC of given dimensions.



2. We draw a perpendicular bisector of side AB which intersects AB at D.

3. Join C to D.



4. Draw a line parallel to AB through C by completing the parallelogram ACQB.



- 5. From D, construct ∠GDB=60°.
- 6. The line cuts parallel line through C at E.



- 7. From E, cut an arc of length DB on the parallel line.
- 8. Mark the point as F.
- 9. Join F to B.
- 10. DBFE is the required parallelogram.



3. Question

We draw a triangles which AB = 6 cm, BC = 9 cm, $\angle ABC = 55^\circ$, let us draw a parallelogram equal in area to that triangle having an angle 60° and length of one side is $\frac{1}{2}$ of AC.

Answer

Steps of Construction:

1. We draw a triangle ABC of given dimensions.



- 2. We draw a perpendicular bisector of side AB which intersects AC at D.
- 3. Join B to D.



4. Draw a line parallel to AC through B by completing the parallelogram AQBC.



- 5. From D, construct \angle GDA=60°.
- 6. The line cuts parallel line through B at E.



- 7. From E, cut an arc of length DA on the parallel line.
- 8. Mark the point as F.
- 9. Join F to A.
- 10. ADEF is the required parallelogram.



4. Question

In \triangle PQR, \angle PQR = 30°, \angle PRQ = 75°, and QR = 8 cm. Let us draw a rectangle equal in area to that triangle.

Answer

Steps of Construction:

1. We draw a triangle PQR of given dimensions.



- 2. We draw a perpendicular bisector of side QR which intersects QR at D.
- 3. Join P to D.



4. Draw a line parallel to AC through B by completing the parallelogram AQBC.



5. As we have to draw a rectangle. The perpendicular bisector through D can be used.

- 6. The perpendicular bisector cuts parallel line through P at E.
- 7. From E, cut an arc of length DR on the parallel line.
- 8. Mark the point as F.

9. Join F to R.

10. EFRD is the required rectangle.



5. Question

Draw an equilateral triangle with length of side 6.5 cm and let us draw a parallelogram equal in area to that triangle and having an angle 45°.

Answer

Steps of Construction:

1. We draw a triangle ABC of given dimensions.



2. We draw a perpendicular bisector of side AB which intersects AB at D.

3. Join C to D.



4. Draw a line parallel to AB through C by completing the parallelogram ACQB.



5. From D, construct ∠GDB=45°.

6. The line cuts parallel line through C at E.



- 7. From E, cut an arc of length DB on the parallel line.
- 8. Mark the point as F.
- 9. Join F to B.

10. DBFE is the required parallelogram.



6. Question

Length of each equal sides of an isosceles triangle in 8 cm and length of base is 5 cm. Let us draw a parallelogram equal in area to that triangle and having

one angle of parallelogram is equal to one of equal angle of isosceles triangle and one side is $\frac{1}{2}$ of equal side.

Answer

Steps of Construction:

1. We draw a triangle ABC of given dimensions.



- 2. We draw a perpendicular bisector of side BC which intersects BC at D.
- 3. Join A to D.



4. Draw a line parallel to BC through A by completing the parallelogram ABCQ.



5. From D, construct \angle EDC= \angle ABC.

6. ABDE is the required parallelogram.



7. Question

Let us draw an isosceles triangle whose equal sides are of length 8 cm. and angle between them is 30°. Let us draw a rectangle whose area is equal to the above isosceles triangle.

Answer

Steps of Construction:

1. We draw a triangle ABC of given dimensions.



2. We draw a perpendicular bisector of side AB which intersects AB at D.

3. Join C to D.



4. Draw a line parallel to AB through C by completing the parallelogram ACQB.



5. As we have to draw a rectangle of same area. We can use the perpendicular bisector drawn through D.

- 6. The perpendicular bisector cuts parallel line through C at E.
- 7. From E, cut an arc of length DB on the parallel line.
- 8. Mark the point as F.
- 9. Join F to B.
- 10. DBFE is the required rectangle.

