Greetings!!

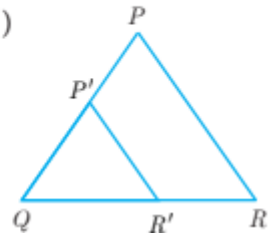
Dear students in this notes we are going to learn about Construction of similar triangles.

Introduction:

So far we have discussed the theoretical approach of similar triangles and their properties. Now we shall discuss the geometrical construction of a triangle similar to a given triangle whose sides are in a given ratio with the corresponding sides of the given triangle. This construction includes two different cases. In one, the triangle to be constructed is smaller and in the other it is larger than the given triangle. So, we use the following term called “scale factor” which measures the ratio of the sides of the triangle to be constructed with the corresponding sides of the given triangle. Let us take the following examples involving the two cases:

Now we are going to do the example sums,

Example 4.10 Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{3}{5}$ of the corresponding sides of the triangle PQR (scale factor $\frac{3}{5} < 1$)



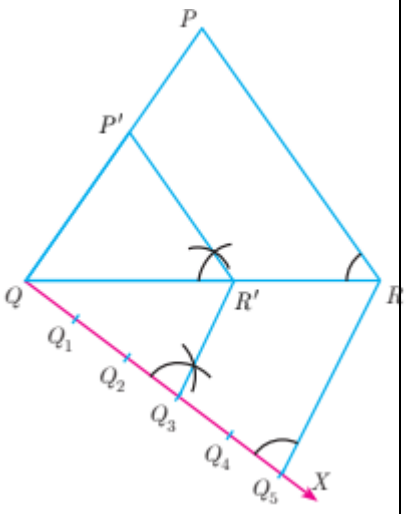
Solution Given a triangle PQR we are required to construct another triangle whose sides are $\frac{3}{5}$ of the corresponding sides of the triangle PQR.

Steps of construction

1. Construct a ΔPQR with any measurement.
2. Draw a ray QX making an acute angle with QR on the side opposite to vertex P.
3. Locate 5 (the greater of 3 and 5 in $\frac{3}{5}$) points. Q_1, Q_2, Q_3, Q_4 and Q_5 on QX so that $QQ_1 = Q_1Q_2 = Q_2Q_3 = Q_3Q_4 = Q_4Q_5$

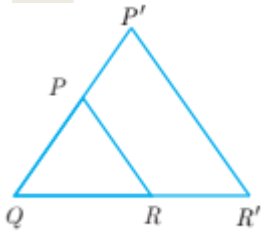
4. Join Q_5R and draw a line through Q_3 (the third point, 3 being smaller of 3 and 5 in $\frac{3}{5}$) parallel to Q_5R to intersect QR at R'.
5. Draw line through R' parallel to the line RP to intersect QP at P'.

   Then, $\Delta P'QR'$ is the required triangle each of whose sides is three-fifths of the corresponding sides of ΔPQR.



Example 4.11 Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{4}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{4} > 1$)

Solution Given a triangle PQR, we are required to construct another triangle whose sides are $\frac{7}{4}$ of the corresponding sides of the triangle PQR.



Rough diagram

Steps of construction

1. Construct a ΔPQR with any measurement.
2. Draw a ray QX making an acute angle with QR on the side opposite to vertex P.
3. Locate 7 points (the greater of 7 and 4 in $\frac{7}{4}$) $Q_1, Q_2, Q_3, Q_4, Q_5, Q_6$ and Q_7 on QX so that $QQ_1 = Q_1Q_2 = Q_2Q_3 = Q_3Q_4 = Q_4Q_5 = Q_5Q_6 = Q_6Q_7$
4. Join Q_4 (the 4th point, 4 being smaller of 4 and 7 in $\frac{7}{4}$) to R and draw a line through Q_7 parallel to Q_4R, intersecting the extended line segment QR at R'.
5. Draw a line through R' parallel to RP intersecting the extended line segment QP at P'

   Then $\Delta P'QR'$ is the required triangle each of whose sides is seven-fourths of the corresponding sides of ΔPQR.

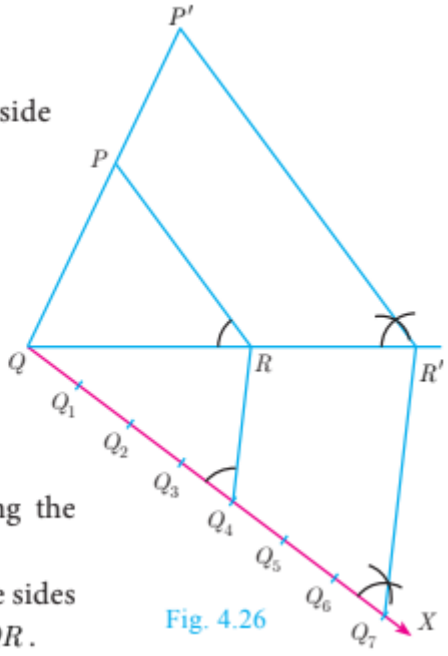


Fig. 4.26

Thank you @@