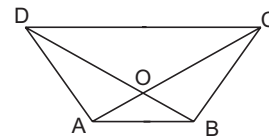# WORKSHEET 1

1. In the given figure, ABCD is a trapezium in which AB ∥ CD and its diagonals intersect at O. If AO = $(3x - 1)$ cm, OC = $(5x - 3)$ cm, BO = $(2x + 1)$ cm and OD = $(6x - 5)$ cm, find the value of x.

2. Prove that the ratio of the perimeters of two similar triangles is the same as the ratio of their corresponding sides.

3. If the diagonal BD of a quadrilateral ABCD bisects both ∠B and ∠D, prove that $\dfrac{AB}{BC} = \dfrac{AD}{CD}$.

4. Sides of same triangles are given below. Determine which of them are right triangles.
   (i) 8 cm, 15 cm, 17 cm
   (ii) 9 cm, 11 cm, 6 cm
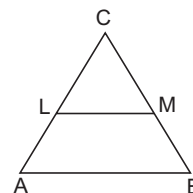   (iii) $(2a - 1)$ cm, $2\sqrt{2a}$ cm, $(2a + 1)$ cm

5. ABC is an isosceles triangle with AB = AC and D is a point on AC such that $BC^2 = AC \times CD$. Prove that BD = AC.

6. Through the vertex D of a parallelogram ABCD, a line is drawn to intersect the sides BA and BC produced at E and F respectively. Prove that

$$\frac{DA}{AE} = \frac{FB}{BE} = \frac{FC}{CD}$$

7. In the given figure, LM ∥ AB.

   If AL = $x - 3$, AC = $2x$, BM = $x - 2$ and BC = $2x + 3$, find the value of x.

8. ABCD is a parallelogram, P is a point on side BC and DP when produced meets AB produced at L.

   Prove that
   (i) $\dfrac{DP}{PL} = \dfrac{DC}{BL}$
   (ii) $\dfrac{DL}{DP} = \dfrac{AL}{DC}$

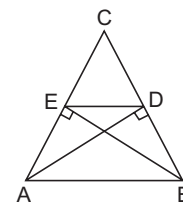9. In the given figure, AD and BE are respectively perpendiculars to BC and AC.

   Show that
   (i) ΔADC ~ ΔBEC
   (ii) CA × CE = CB × CD
   (iii) ΔABC ~ ΔDEC
   (iv) CD × AB = CA × DE

10. In the given figure, ABC is a triangle in which ∠B = ∠C and BD = CE. Prove that DE ∥ BC.
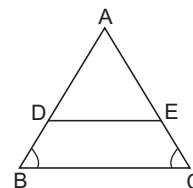
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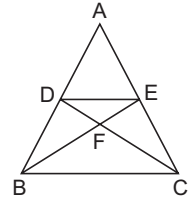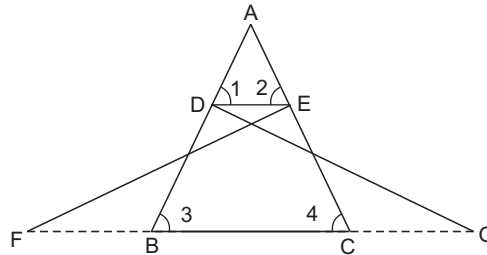
11. In a $\triangle ABC$, P and Q are points on AB and AC respectively, such that PQ $\parallel$ BC. Prove that median AD, drawn from A to BC, bisects PQ.

12. In the given figure, DE $\parallel$ BC and AD : DB = 5 : 4. Find the ratio ar($\triangle$DEF) : ar($\triangle$CFB).

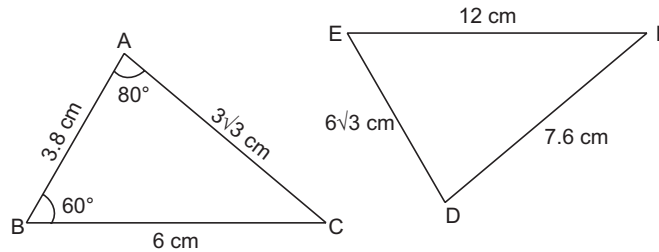13. In $\triangle ABC$, if AD $\perp$ BC and $\dfrac{BD}{DA} = \dfrac{DA}{DC}$, then prove that $\triangle ABC$ is a right triangle.

14. In the given figure, $\triangle$FEC $\cong$ $\triangle$GBD and $\angle 1 = \angle 2$. Prove that $\triangle$ADE $\sim$ $\triangle$ABC.

15. In the given figures, find $\angle$F.

16. P and Q are points on sides AB and AC respectively of $\triangle$ABC. If AP = 3 cm, PB = 6 cm, AQ = 5 cm and QC = 10 cm, show that BC = 3 PQ.
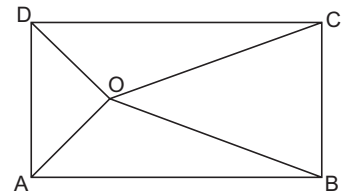
17. Triangles ABC and DEF are similar.
    (i) If ar($\triangle$ABC) = 16 cm^2, ar($\triangle$DEF) = 25 cm^2 and BC = 2.3 cm, find EF.
    (ii) If AC = 19 cm and DF = 8 cm, find the ratio of the area of two triangles.

18. In an equilateral triangle ABC, the side BC is trisected at D. Prove that 9 AD^2 = 7AB^2.

19. O is any point inside a rectangle ABCD. Prove that OB^2 + OD^2 = OA^2 + OC^2.

20. D and E are points on the sides AB and AC respectively of a $\triangle$ABC. In each of the following cases, determine whether DE $\parallel$ BC or not.
    (i) AD = 5.7 cm, DB = 9.5 cm, AE = 4.8 cm and EC = 8 cm
    (ii) AB = 11.7 cm, AC = 11.2 cm, BD = 6.5 cm and AE = 4.2 cm
    (iii) AB = 10.8 cm, AD = 6.3 cm, AC = 9.6 cm and EC = 4 cm
    (iv) AD = 7.2 cm, AE = 6.4 cm, AB = 12 cm and AC = 10 cm

ANSWERS

1. $x = 2$

4. (*i*) Not right angled triangle.　　　(*ii*) Not right angled triangle.　　　(*iii*) Right angled triangle.

7. $x = 9$

12. 25 : 81

15. $\angle F = 60°$

17. (*i*) 2.875 cm　　　　　　(*ii*) 361 : 64

20. (*i*) Yes　　　　(*ii*) No　　　　(*iii*) Yes　　　　(*iv*) No