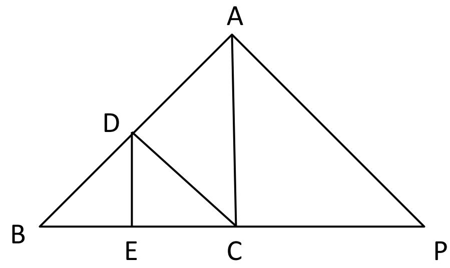
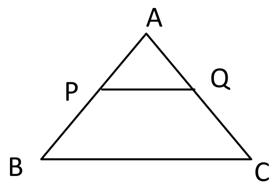
TRIANGLE

1. **In the adjoining figure, seg DE ∥ side AC and seg DC ∥ side AP.**

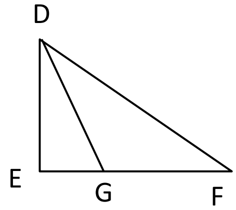
   Prove that: $\frac{BE}{EC} = \frac{BC}{CP}$



2. **In △ ABC, P and Q are the points on the sides AB and AC such that seg PQ ∥ Side BC. AP = 4x –3, AQ = 8x – 7, BP = 3x – 1, CQ = 5x – 3. Find 'x'.**
3. **☐ ABCD is a parallelogram. E is a point on side BC. Ray DE intersects ray AB in point T. Prove that DE x BE = CE x TE.**
4. **In △ ABC, PQ is a line segment intersecting AB at P and AC at Q such that PQ ∥ BC. If PQ divides △ ABC into two equal parts equal in area, find** $\frac{BP}{AB}$ **.**
5. **The sides of the smaller triangle out of two similar triangles are 4, 5 and 6. If the perimeter of the larger triangle is 90. Find the lengths of the sides of the larger triangle.**
6. **☐ ABCD is a parallelogram. P is the midpoint of side CD. Seg BP meets diagonal AC at X. Prove that 3 AX = 2 AC.**
7. **In adjoining fig., seg PQ ∥ side BC, A (☐PBCQ) = 2 A (△ APQ).**
   Prove that BC = $\sqrt{3}$ **PQ.**



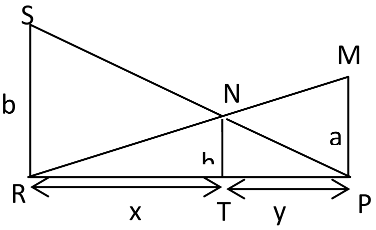
8. **△ ABD is a triangle in which ∠ A = 90^0 and seg AC ⊥ hypotenuse BD. Show that (i) AB^2 = BC x BD (ii) AD^2 = BD x CD (iii) AC^2 = BC x CD.**
9. **The perpendicular AD on the base BC of △ ABC intersects BC at D so that BD = 3 CD. Prove that $2AB^2 = 2AC^2 + BC^2$.**
10. **△ ABC is a triangle in which ∠ C = 90^0. Let BC = a, CA = b, AB = c and let p be the length of the perpendicular from C on AB. Prove that (i) cp = ab (ii)** $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$**.**
11. **Prove that three times the square of any side of an equilateral triangle is equal to four times the square of an altitude.**
12. **In △ MNP, ∠ MPN = 90^0. Q and R are midpoints of sides MP and NP respectively. Prove that $4(NQ^2 + MR^2) = 5\ MN^2$.**
13. **In the adjoining fig, ∠ DEF = 90^0. EF = 3 EG. Show that $EF^2 = 9DG^2 - 9\ DE^2$.**



14. Two triangles $\triangle$ ABC and $\triangle$ DBC lie on the same side of the base BC. From a point P on BC, PQ ll AB and PR ll BD are drawn. They intersect AC at Q and DC at R respectively. Prove that QR ll AD.

15. In a $\triangle$ ABC, if D is a point on BC, such that $\frac{BD}{DC} = \frac{AB}{AC}$, prove that AD is the bisector of $\angle$ A.

16. Two poles of height 'a' meters and 'b' meters are 'p' meters apart. Prove that the height 'h' of the point of intersection N of the lines joining the top of each pole to the foot of the opposite pole is $\frac{ab}{a+b}$ meters.



17. In $\triangle$ABC, seg MN ll side AC, seg MN divides ABC into two equal parts equal in area. Determine $\frac{AM}{AB}$.

18. In right angle $\triangle$ ABC, $\angle$ B = 90^0, P is the mid-point of the side BC. Prove that $AC^2 = 4AP^2 - 3AB^2$.

19. In $\triangle$ABC, D is the mid-point of side BC. DE $\perp$ AC, A - E- C. If $EA^2 - EC^2 = AB^2$. Prove that $\angle$ ABC = 90^0.

20. In $\triangle$ABC, seg MN ll Side AC, seg MN divides $\triangle$ ABC into two parts such that A($\triangle$ MBN) = 3A(☐AMNC). Show that $\frac{AM}{AB} = \frac{2-\sqrt{3}}{2}$.

21. ABC is a triangle in which AB = AC and D is any point in BC. Prove that : $(AB)^2 - (AD)^2$ = BD. CD.

22. AD is the median of $\triangle$ ABC. O is any point on AD. BO and CO produced meet AC and AB in E and F respectively. AD is produced to X such that OD = DX. Prove that: AO: AX = AF: AB.

23. ABC and DBC are two triangles on the same base BC. If AD intersects BC at O, prove that : ar($\triangle$ ABC) : ar($\triangle$ DBC) = AO : DO.

24. In $\triangle$ ABC, if AD is the median, show that $AB^2 + AC^2 = 2\,[AD^2 + BD^2]$.

25. D is the mid-point of side BC of $\triangle$ ABC and E is the mid-point of AD. BE produced meets AC at the point M. Prove that BE = 3 EM.

26. P is the mid-point of the side AD of a parallelogram ABCD. Straight line BP intersects the diagonal AC at R and the side CD(produced) at Q. Prove that QR = 2 RB.

27. If A is the area of a right – angled triangle and 'b' is one of the sides containing right angle. Prove that the length of altitude on the hypotenuse is $\frac{2Ab}{\sqrt{b^4 + 4A^2}}$.