DAV PUBLIC SCHOOL, POKHARIPUT
SUBJECT-MATHEMATICS, CLASS- X
CHAPTER-6 (TRIANGLES)
WORKSHEET-BASIC

Time – ¾ hr MM-20

Fill in the blanks (2 X 1 = 2)

1. Two polygons of the same number of sides are similar, if their corresponding angles are_____ and their corresponding sides are _____.
2. If $\Delta ABC \sim \Delta PQR$,perimeter of $\Delta ABC = 32cm$, perimeterof $\Delta PQR = 48cm$ & $PR = 6$cm, then the length of $AC =$ _____.

Choose the correct option (2 X 1 = 2)

3. $\Delta DEF \sim \Delta ABC$. If DE : AB =2 :3 and ar (ΔDEF) is equal to 44 sq.units, then ar(ΔABC)in sq. units is

   a. 99 b. 120 c. $\frac{176}{9}$ d.66

4. A man goes 15m due east and then 20mdue north. His distance from the starting point is

   a. 35m b.5m c. 25m d. 15m

Answer the following questions: (2 x 1 =2)

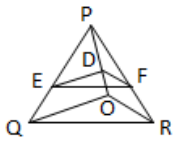
5. It is given that Δ DEF ~ Δ RPQ. Is it true to say that ∠D=∠R and ∠F=∠P? Why?
6. ABC is an isosceles triangle with AC = BC. If $AB^2 = 2AC^2$. Prove that ABC is a right triangle.

Short Answer Type – I (2 x 2 =4)

7. Diagonals AC and BD of a trapezium ABCD with AB ‖ DC intersect each other at the point O. Using a similarity criterion for two triangles, show that $\frac{OA}{OC} = \frac{OB}{OD}$.
8. If the areas of two similar triangles are equal, prove that they are congruent.

Short Answer Type – II (2 x 3 =6)

9. O is any point inside a rectangle ABCD. Prove that $OB^2 + OD^2 = OA^2 + OC^2$.
10. In the given figure, DE ‖ OQ and DF ‖ OR. Show that EF ‖ QR.



Long Answer Type -(1 x 4 =4)

11. Side AB, BC and median AD of a triangle ABC are respectively proportional to sides PQ and QR and median PM of triangle PQR. Show that $\Delta ABC \sim \Delta PQR$.

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SUBJECT-MATHEMATICS, CLASS- X
CHAPTER-6 (TRIANGLES)
WORKSHEET-STANDARD

Time – ¾ hr MM-20

Fill in the blanks (2 X 1 = 2)

1. In two similar triangles ABC and DEF, AC= 3cm and DF=5cm. the ratio of the area of two triangles is _____.
2. A ladder 26m long reaches a window 24m above the ground. The distance of the foot of the ladder from the base of the wall is _____.

Choose the correct option (2 X 1 = 2)

3. In $\Delta ABC \text{ and } \Delta DEF, \angle B = \angle E, \frac{BA}{DE} = \frac{BC}{EF}$, then
   a. $\Delta ABC \sim \Delta DEF$ b. $\Delta ABC \sim \Delta EDF$ c. $\Delta ABC \sim \Delta FED$ d. $\Delta ABC \sim \Delta EFD$
4. If $\Delta ABC \sim \Delta PQR, \frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \frac{9}{4}, AB = 18cm \ \& \ BC = 15cm$, then PR is equal to
   a. 10cm b. 12cm c. $\frac{20}{3}cm$ d. 8 cm

Answer the following questions: (2 x 1 =2)

5. If ABC is an equilateral triangle with AD ⊥ BC, then prove that $AD^2 = 3DC^2$
6. In $\Delta ABC, \angle A$ is acute. BD and CE are ⊥s on AC and AB respectively. Prove that $AB \times AE = AC \times AD$.

Short Answer Type – I (2 x 2 =4)

7. In a ΔABC, AD is a median and E is the midpoint of AD. If BE is produced it meets AC in F. show that AF= 1/3 AC.
8. O is any point inside a rectangle ABCD. Prove that $OB^2 + OD^2 = OA^2 + OC^2$.

Short Answer Type – II (2 x 3 =6)

9. Prove that the ratio of the altitudes of two similar triangles is equal to the ratio of their corresponding sides.
10. ΔABC is right angled at B. side BC is trisected at points D and E . prove that $8AE^2 = 3AC^2 + 5AD^2$

Long Answer Type -(1 x 4 =4)

11. In an equilateral triangle ABC, D is any point on side BC such that BD = $\frac{1}{3}$ BC. Prove that $9AD^2 = 7AB^2$.

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SUBJECT-MATHEMATICS, CLASS- X
CHAPTER-6 (TRIANGLES)
WORKSHEET-ADVANCED

Time – ¾ hr MM-20

Fill in the blanks (2 X 1 = 2)

1. If in a right-angled triangle with sides a & b and hypotenuse c , the altitude drawn on the hypotenuse is x, then $ab =$_____
2. In a triangle ABC, right angled at B, BD ⊥ AC, then $AD \times DC =$_____.

Choose the correct option (2 X 1 = 2)

3. If in a triangle, a line segment PQ intersect PQ intersect AB & AC at P & Q respectively such that PQ ‖ BC and it divides the triangle ABC into two equal parts, then the value of $\frac{BP}{AB}$ is

   a. $\frac{\sqrt{2}-1}{\sqrt{2}}$ b. $\frac{\sqrt{2}+1}{\sqrt{2}}$ c. $\frac{\sqrt{2}}{\sqrt{2}-1}$ d. $\frac{\sqrt{2}}{\sqrt{2}+1}$

4. In $\Delta ABC, DE$ ‖BC, and $\frac{AD}{DB} = \frac{5}{3}$, then $\frac{DE}{BC}$ equals to

   a. $\frac{5}{3}$ b. $\frac{5}{8}$ c. $\frac{25}{9}$ d. $\frac{3}{5}$

Answer the following questions: (2 x 1 =2)

5. AD is the bisector of angle A of triangle ABC. AB = 6cm, BD =3cm & DC= 2cm. Find the value of AC.
6. Corresponding sides of two similar triangles are in the ratio 2:3. If the area of the smaller triangle is 48cm², find the area of the larger triangle.

Short Answer Type – I (2 x 2 =4)

7. In an equilateral triangle ABC, if AD perpendicular to BC, then find the value of $\frac{AB^2}{AD^2}$
8. ΔABC is an isosceles triangle in which AB = AB and D is a point on BC. Prove that $AB^2 - AD^2 = BD \times CD$.

Short Answer Type – II (2 x 3 =6)

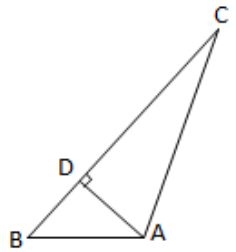
9. In a quadrilateral ABCD, ∠A+∠D=90°, prove that AC²+BD²=AD²+BC²
10. In an equilateral triangle ABC, D is a point on side BC such that BD = $\frac{1}{3}$ BC. Prove that $9AD^2 = 7\ AB^2$

Long Answer Type -(1 x 4 =4)

11. AD is a median of a triangle ABC. Prove that $AC^2 + AB^2 = 2AD^2 + \frac{1}{2}BC^2$

EXTRA QUESTIONS

1. In the given figure, AD ⊥ BC. Prove that $AB^2 + CD^2 = BD^2 + AC^2$



2. BL and CM are medians of a triangle ABC right angles at A.
   Prove that $4(BL^2 + CM^2) = 5BC^2$
3. If AD ⊥ BC, and BD = $\frac{1}{3}$ CD. Prove that $2CA^2 = 2AB^2 + BC^2$
4. State and prove Pythagoras theorem.
5. ABC is a triangle in which $\angle ABC > 90°$ and AD ⊥ BC produced.
   Prove that $AC^2 = AB^2 + BC^2 + 2BC.BD$
6. ABC is an equilateral triangle. D is a point on BC such that BD = $\frac{1}{3}$ BC.
   Prove that $9AD^2 = 7AB^2$
7. O is any point inside a rectangle ABCD. Prove that $OB^2 + OD^2 = OA^2 + OC^2$
8. ΔABC is an isosceles triangle in which AB = AC and D is a point on BC.
   Prove that $AB^2 - AD^2 = BD \times CD$
9. In right-angled triangle ABC in which $\angle C = 90°$, if D is the mid-point of BC, prove that $AB^2 = 4AD^2 - 3AC^2$
10. Prove that the sum of the squares of the diagonals of a parallelogram is equal to the sum of the squares of its sides.
11. ABC is a triangle in which AB=AC and D is any point in BC. Prove that $AB^2 - AD^2 = BD.CD$
12. In $\Delta ABC, DE \parallel BC$, where D and E are points on AB and AC respectively. if AD=2cm and DB= 3cm, then find the ratio of ar(ΔADE) to ar(ΔABC)
13. If two sides and a median bisecting the third side of a triangle are respectively proportional to the corresponding sides and the median of another triangle, then the two triangles are similar.
14. In $\Delta ABC, \angle ABC = 135°, prove\ that\ AC^2 = AB^2 + BC^2 + 4\ ar(\Delta ABC)$
15. In $\Delta ABC, AD \perp BC\ and\ BC: CD = 4:1, prove\ that\ 2AC^2 + BC^2 = 2AB^2$
16. In ΔABC, a line XY parallel to BC cuts AB at X and AC at Y. If BY bisects $\angle XYC$, then prove that BC=CY
17. If D and E are points on the sides AB and AC respectively of a ΔABC such that DE‖ BC and divides ΔABC into two parts of equal area. Prove that $\frac{BD}{AB} = \frac{2-\sqrt{2}}{2}$

18. If ‘A’ be the area of a right triangle and ‘b’ be one of the sides containing the right angle, then prove that the length of the altitude on the hypotenuse is $\frac{2Ab}{\sqrt{b^4+4A^2}}$
19. BL and CM are medians of a triangle ABC right angled at A. prove that $4(BC^2 + CM^2) = 5BC^2$
20. If the bisector of an angles of a triangle bisects the opposite side, prove that the triangle is isosceles.