QUESTION BANK

EXERCISE - 1

Q.1 In a quadrilateral ABCD, diagonals intersect each other at O such that $\frac{AO}{OC} = \frac{BO}{OD}$. Prove that quadrilateral is a trapezium.

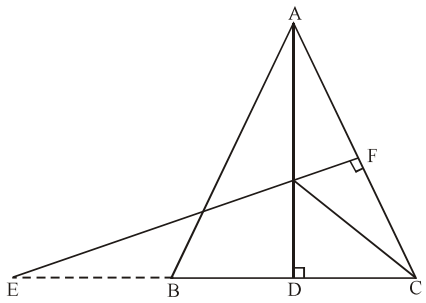


Figure Q.2

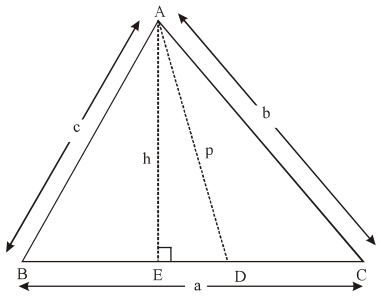


Figure Q.4

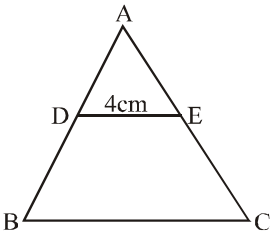


Figure Q.6

Q.2 In figure, E is a point on side CB produced of a isosceles triangle ABC with AB = AC. If AD ⊥ BC and EF ⊥ AC prove that Δ ABD ~ Δ ECF.

Q.3 A vertical stick 12m long casts a shadow 8 m long on the ground. At the same time a tower casts the shadow 40m long on the ground. Find the height of the tower.

Q.4 In figure, AD is the median of Δ ABC and AE ⊥ BC. Prove that $b^2 + c^2 = 2p^2 + \frac{1}{2}a^2$.

Q.5 ABC is an isosceles triangle with AC = BC. If $AB^2 = 2AC^2$, prove that ABC is a right triangle.

Q.6 In the given figure, DE || BC. If DE = 4 cm, BC = 8 cm and area of ΔADE = 25 sq. cm, find the area of ΔABC.

Q.7 Prove that ratio of areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.

EXERCISE - 2

Fill in the Blanks :

Q.1 All circles are .....

Q.2 All squares are .....

Q.3 All ..... triangles are similar.

Q.4 Two polygons of the same number of sides are similar, if their corresponding angles are ..... and their corresponding sides are in the same .....

Q.5 If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the ..... ratio.

Q.6 If a line divides any two sides of a triangle in the same ratio, then the line is parallel to the ..... side.

Q.7 All congruent figures are similar but the similar figures need ..... be congruent.

Q.8 Two polygons of the same number of sides are similar, if all the corresponding angles are .....

Q.9 The diagonals of a quadrilateral ABCD intersect each other at the point O such that $\frac{AO}{BO} = \frac{CO}{DO}$. ABCD is a .....

Q.10 A line drawn through the mid-point of one side of a triangle parallel to another side bisects the ..... side.

Q.11 Line joining the mid-points of any two sides of a triangle is ..... to the third side.

Q.12 A vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time a tower casts a shadow 28 m long. The height of the tower is .....

True-False Statements –

Q.13 Two figures having the same shape but not necessarily the same size are called similar figures.

Q.14 All the congruent figures are similar but the converse is not true.

Q.15 If in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio and hence the two triangles are similar.

Q.16 If in two triangles, two angles of one triangle are respectively equal to the two angles of the other triangle, then the two triangles are similar

Q.17 If in two triangles, corresponding sides are in the same ratio, then their corresponding angles are equal and hence the triangles are similar.

Q.18 If one angle of a triangle is equal to one angle of another triangle and the sides including these angles are in the same ratio (proportional), then the triangles are similar.

Q.19 The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

Q.20 In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

Q.21 If in a triangle, square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle.

Q.22 Diagonals AC and BD of a trapezium ABCD with AB || DC intersect each other at the point O, $\frac{OA}{OC} = \frac{OB}{OD}$.

Q.23 E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Δ ABE is similar to Δ CFB.

EXERCISE - 3

Q.1 If in an isosceles triangle 'a' is the length of the base and 'b' the length of one of the equal side, then its area is–

(A) $\frac{a}{4}\sqrt{4a^2 - a^2}$ (B) $\frac{b}{4}\sqrt{4b^2 - a^2}$ (C) $\frac{a+b}{4}\sqrt{a^2 - b^2}$ (D) $\frac{a-b}{4}\sqrt{b^2 - a^2}$

Q.2 If an equilateral triangle of area X and a square of area Y have the same perimeter, then –

(A) $X > Y$ (B) $X < Y$ (C) $X = Y$ (D) $X \leq Y$

Q.3 ABC is a triangle. If D is a point in the plane of the triangle such that the perpendicular distance from D to the three sides of the triangle are all equal, then there exist(s)–

(A) just one such point as D (B) three such point as D

(C) four such points as D (D) none of the above

Q.4 PSR is a triangle right angled at S. D is the mid-point of SR. If the bisector of $\angle$ PSR and perpendicular bisector of SR meet at O, then triangle OSD is –

(A) scalene (B) equilateral (C) isosceles right angled (D) acute-angled

Q.5 If any two sides of a triangle are produced beyond its base and the exterior angles thus obtained aer bisected, then these bisectors will include an angle equal to –

(A) half the sum of the base angles (B) sum of the base angles

(C) half the difference of the base angles (D) difference of the base angles

Q.6 If x is the length of the median of an equilateral triangle, then its area is –

(A) x^2 (B) $\frac{\sqrt{3}}{2}x^2$ (C) $\frac{\sqrt{3}}{3}x^2$ (D) $\frac{1}{2}x^2$

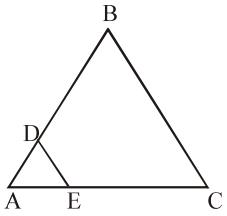
Q.7 In a triangle ABC, points P, Q and R are the mid-points of the sides AB, BC and CA respectively. If the area of the triangle ABC is 20 sq. units, then find the area of the triangle PQR –

(A) 10 sq. units (B) $5\sqrt{3}$ sq. units (C) 5 sq. units (D) 5.5 sq. units

Q.8 The area of a right angled triangle is 40 sq. cm. and its perimeter is 40 cm. The length of its hypotenuse is –
(A) 16 cm. (B) 18 cm. (C) 17 cm. (D) Data sufficient

Q.9 An isoceles triangle has a 10 inch base and two 13 inch sides. What other value can the base have and still yield a triangle with the same area –
(A) 18" (B) 19" (C) 24" (D) 27"

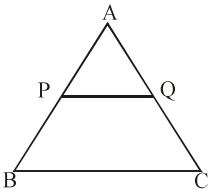
Q.10 If each side of triangle ABC is of length 4 and if AD is 1 and ED $\perp$ AB. What is area of region BCDE –



(A) $8\sqrt{3}$ (B) $4\sqrt{3}$
(C) $4.5\sqrt{3}$ (D) $3.5\sqrt{3}$

Q.11 a and b are the roots of the equation $(x - A)(x - B) + c = 0$, $c \neq 0$. Then the roots of the equations : $(x - a)(x - b) = c$ are –
(A) A, c (B) B, c (C) A, B (D) A + c, B + c

Q.12 In the adjacent figure, P and Q are points on the sides AB and AC respectively of a triangle ABC. PQ is parallel to BC and divides the triangle ABC into 2 parts, equal in area. What is the ratio of PA : AB –



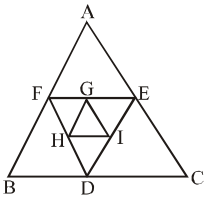
(A) 1 : 1 (B) $(\sqrt{2}-1):\sqrt{2}$ (C) $1:\sqrt{2}$ (D) $(\sqrt{2}-1):1$

Q.13 ABC and BDE are two equilateral triangles such that D is the mid-point of BC. Ratio of the areas of triangles ABC and BDE is–
(A) 2 : 1 (B) 1 : 2 (C) 4 : 1 (D) 1 : 4

Q.14 Sides of two similar triangles are in the ratio 4 : 9. Areas of these triangles are in the ratio –
(A) 2 : 3 (B) 4 : 9 (C) 81 : 16 (D) 16 : 81

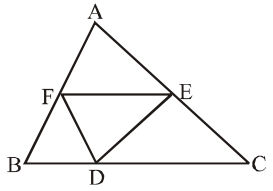
Q.15 In Δ ABC, AB = $6\sqrt{3}$cm, AC = 12cm and BC = 6 cm. The angle B is –
(A) (A) 120° (B) 60° (C) 90° (D) 45°

Q.16 D, E, F are midpoints of BC, CA and AB respectively. G, H, I are midpoints of FE, FD, DE respectively. Areas of ΔDHI and ΔAFE are in the ratio-



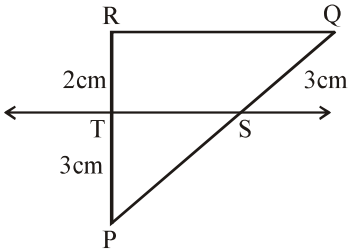
(A) 1 : 3 (B) 1 : 4
(C) 1 : 9 (D) 1 : 16

Q.17 In triangle ABC, D, E, F are points of trisection of BC, AC and AB respectively. Which of the following statement is not true ?
(A) Area ΔEDC = 2/9 area ΔABC
(B) Area ΔFBD = 2/7 area AFDC
(C) Area ΔDEF = 2/9 area ΔABC
(D) Area (ΔEDC + ΔDBF + ΔAFE) = 2 area ΔDEF



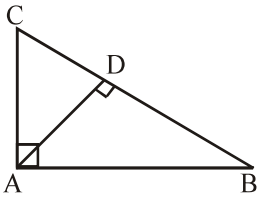
Q.18 The area of a right angled isosceles triangle whose hypotenuse is equal to 270 m is-
(A) 19000 m^2 (B) 18225 m^2 (C) 17256 m^2 (D) 18325 m^2

Q.19 In the adjoining figure, if ST || QR. What is the length of PS–
(A) 2 cm. (B) 4.5 cm.
(C) 4 cm. (D) 3 cm.



Q.20 If Δ DEF if DE = $6\sqrt{3}$ cm., DF = 12 cm. and EF = 6 cm, then the angle E is –
(A) 120° (B) 90° (C) 60° (D) 45°

Q.21 In the adjoining figure, $\frac{BD}{DA}$ is equal to –



(A) $\left(\frac{AB}{AC}\right)^2$ (B) $\frac{AB}{AC}$ (C) $\left(\frac{AB}{AD}\right)^2$ (D) $\frac{AB}{AD}$

Q.22 If ABC is an isosceles triangle and D is a point on BC such that AD ⊥ BC, then –

(A) $AB^2 - AD^2 = BD.DC$ (B) $AB^2 - AD^2 = BD^2 - DC^2$

(C) $AB^2 + AD^2 = BD.DC$ (B) $AB^2 + AD^2 = BD^2 - DC^2$

Q.23 In a Δ ABC, ∠ A = 90°, AB = 5 cm and AC = 12 cm. If AD ⊥ BC, then AD is equal to –

(A) $\frac{13}{2}$cm. (B) $\frac{60}{13}$cm. (C) $\frac{13}{60}$cm. (D) $\frac{2\sqrt{15}}{13}$cm.

EXERCISE - 4

MATCH THE COLUMN

Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in **column I** have to be matched with statements (p, q, r, s) in **column II**.

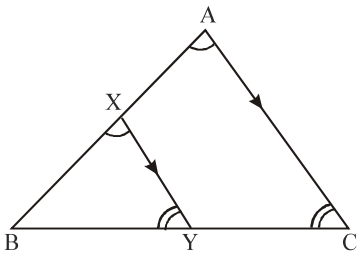
Q.1 If in a Δ ABC, DE || BC and intersects AB in D and AC in E, then match the column.

Column I	**Column II**
(A) $\frac{AD}{DB}$	(p) $\frac{AC}{AE}$
(B) $\frac{AB}{AD}$	(q) $\frac{AE}{EC}$
(C) $\frac{DB}{AB}$	(r) $\frac{AE}{AC}$
(D) $\frac{AD}{AB}$	(s) $\frac{EC}{AC}$

Q.2 D is the mid-point of side BC of Δ ABC. AD is bisected at point E and BE produced cuts AC at point X, then match the column.

Column I	**Column II**
(A) BE : EX	(p) 1 : 2
(B) XB : MD	(q) 2 : 1
(C) EX : MD	(r) 3 : 1
(D) AX : XM	(s) 1 : 1

Q.3 In figure, the line segment XY is parallel to the side AC of Δ ABC and it divides the triangle into two parts of eual areas, then match the column.



Column I	**Column II**
(A) AB : XB	(p) $\sqrt{2}:1$
(B) ar (Δ ABC) : ar (Δ XBY)	(q) 2 : 1
(C) AX : AB	(r) $(\sqrt{2}-1)^2:\sqrt{2}$
(D) ∠ X : ∠ A	(s) 1 : 1

EXERCISE - 5

PREVIOUS YEARS BOARD QUESTIONS

Q.1 The areas of two similar triangles are 121 cm^2 and 64 cm^2 respectively. If the median of the first triangle is 12.1cm, find the corresponding median of the other.

Q.2 The areas of two similar triangles are 100 cm^2 and 49 cm^2 respectively. If the altitude of the bigger triangles is 5 cm., find the corresponding altitude of the other.

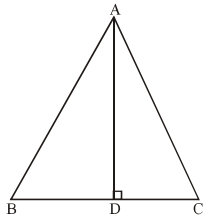


Figure Q.3

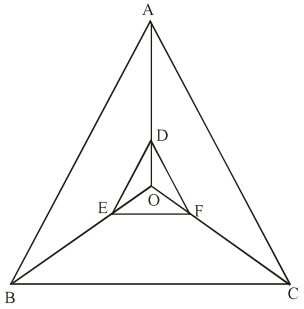


Figure Q.4

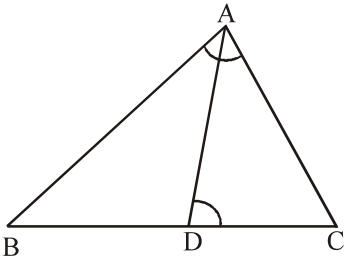


Figure Q.6

Q.3 In an equilateral traingle ABC, AD is the altitude drawn from A on side BC. Prove that $3AB^2 = 4AD^2$.

Q.4 Any point O, inside Δ ABC, is joined to its vertices. From a point D on AO, DE is drawn so that DE || AB and EF || BC as shown in figure. Prove that DF || AC.

Q.5 The area of two similar traingles are 81 cm^2 and 49 cm^2 respectively. If the altitude of the bigger triangle is 4.5cm, find the corresponding altitude of the smaller traingle.

Q.6 In the given figure, D is a point on the side BC of Δ ABC such that $\angle ADC = \angle BAC$. Prove that $\frac{CA}{CD} = \frac{CB}{CA}$.

Q.7 In the given figure, ABCD is a trapezium in which AB || DC. The diagonals AC and BD intersect at O. Prove that $\frac{AO}{OC} = \frac{BO}{DO}$.

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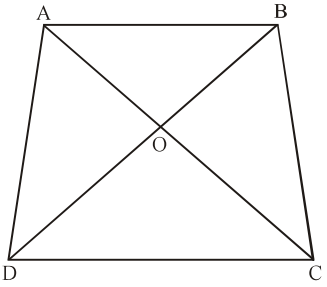

Figure Q.7

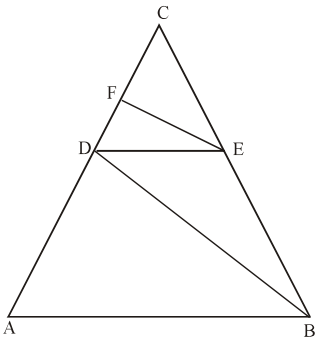

Figure Q.8

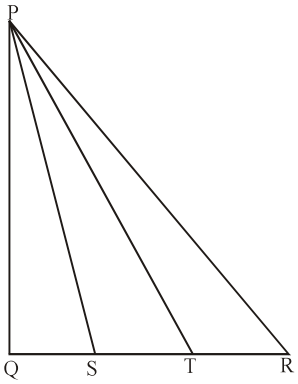

Figure Q.11

Q.8 In figure, AB || DE and BD || EF. Prove that $DC^2 = CF \times AC$.

Q.9 In Δ ABC, AD $\perp$ BC, prove that $AB^2 + CD^2 = AC^2 + DB^2$.

Q.10 Prove that the sum of the squares of the sides of a rhombus is equal to sum of the squares of its diagonals.

Q.11 In figure, S and T trisect the side QR of a right triangle PQR, prove that $8PT^2 = 3PR^2 + 5PS^2$.

Q.12 P and Q are points on the sides CA and CB respectively of a Δ ABC right-angled at C. Prove that $AQ^2 + BP^2 = AB^2 + PQ^2$.