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TRIANGLES

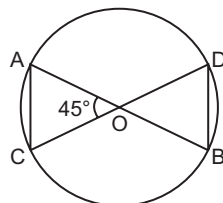
OBJECTIVE SECTION

[BASIC/STANDARD]

I. MULTIPLE CHOICE QUESTIONS

1. In the figure, O is the point of intersection of two chords AB and CD such that $OB = OD$. Then triangles OAC and ODB are:

- (a) equilateral but not similar
(b) isosceles but not similar
(c) equilateral and similar
(d) isosceles and similar

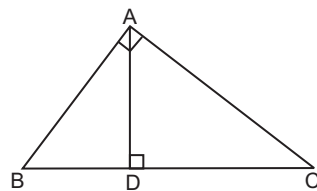


2. D and E are respectively the points on the sides AB and AC of a triangle ABC such that $AD = 2$ cm, $BD = 3$ cm, $BC = 7.5$ cm and $DE \parallel BC$. Then, length of DE (in cm) is:

- (a) 2.5 (b) 3 (c) 5 (d) 6

3. In the figure, $\angle BAC = 90^\circ$ and $AD \perp BC$. Then :

- (a) $BD \cdot CD = BC^2$
(b) $AB \cdot AC = BC^2$
(c) $BD \cdot CD = AD^2$
(d) $AB \cdot AC = AD^2$



4. If the lengths of the diagonals of a rhombus are 16 cm and 12 cm, then, the length of the side of the rhombus is :

- (a) 9 cm (b) 10 cm (c) 8 cm (d) 20 cm

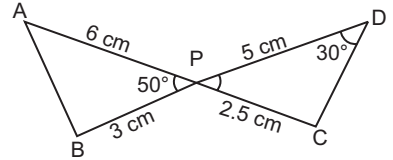
5. If $\triangle ABC \sim \triangle EDF$ and $\triangle ABC$ is not similar to $\triangle DEF$, then which of the following is not true?

- (a) $BC \cdot EF = AC \cdot FD$ (b) $AB \cdot EF = AC \cdot DE$
(c) $BC \cdot DE = AB \cdot EF$ (d) $BC \cdot DE = AB \cdot FD$

6. If in two triangles ABC and PQR, $\frac{AB}{QR} = \frac{BC}{PR} = \frac{CA}{PQ}$, then :

- (a) $\triangle PQR \sim \triangle CAB$ (b) $\triangle PQR \sim \triangle ABC$
(c) $\triangle CBA \sim \triangle PQR$ (d) $\triangle BCA \sim \triangle PQR$

7. In the figure, two line segments AC and BD intersect each other at the point P such that PA = 6 cm, PB = 3 cm, PC = 2.5 cm, PD = 5 cm, $\angle APB = 50^\circ$ and $\angle CDP = 30^\circ$. Then $\angle PBA$ is equal to:



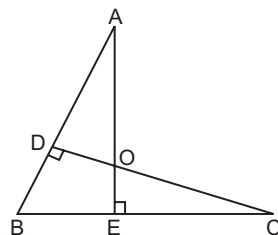
- (a) 50° (b) 30° (c) 60° (d) 100°
8. If in triangles DEF and PQR, $\angle D = \angle Q$ and $\angle R = \angle E$, then which of the following is not true?
- (a) $\frac{EF}{PR} = \frac{DE}{QR}$ (b) $\frac{DE}{PQ} = \frac{EF}{RP}$ (c) $\frac{DE}{QR} = \frac{DF}{PQ}$ (d) $\frac{EF}{RP} = \frac{DE}{QR}$
9. If in triangles ABC and DEF, $\angle B = \angle E$, $\angle F = \angle C$ and $AB = 3 DE$, then the two triangles are:
- (a) congruent but not similar (b) similar but not congruent
(c) neither congruent nor similar (d) congruent as well as similar
10. If it is given that $\triangle ABC \sim \triangle PQR$, with $\frac{BC}{QR} = \frac{1}{3}$, then $\frac{\text{ar}(\triangle PQR)}{\text{ar}(\triangle ABC)}$ is equal to:
- (a) 9 (b) 3 (c) $\frac{1}{3}$ (d) $\frac{1}{9}$
11. It is given that $\triangle ABC \sim \triangle DFE$, $\angle A = 30^\circ$, $\angle C = 50^\circ$, $AB = 5$ cm, $AC = 8$ cm and $DF = 7.5$ cm. Then, which of the following is true?
- (a) $DE = 12$ cm, $\angle F = 50^\circ$ (b) $DE = 12$ cm, $\angle F = 100^\circ$
(c) $EF = 12$ cm, $\angle D = 100^\circ$ (d) $EF = 12$ cm, $\angle D = 30^\circ$
12. If in triangles ABC and DEF, $\frac{AB}{DE} = \frac{BC}{FD}$, then they will be similar, when:
- (a) $\angle B = \angle E$ (b) $\angle A = \angle D$ (c) $\angle B = \angle D$ (d) $\angle A = \angle F$
13. If $\triangle ABC \sim \triangle QRP$, $\frac{\text{ar}(\triangle ABC)}{\text{ar}(\triangle QRP)} = \frac{9}{4}$, $AB = 18$ cm and $BC = 15$ cm, then PR is equal to:
- (a) 10 cm (b) 12 cm (c) $\frac{20}{3}$ cm (d) 8 cm
14. If S is a point on side PQ of a $\triangle PQR$ such that $PS = QS = RS$, then:
- (a) $PR \cdot QR = RS^2$ (b) $QS^2 + RS^2 = QR^2$
(c) $PR^2 + QR^2 = PQ^2$ (d) $PS^2 + RS^2 = PR^2$
15. If it is given that $\triangle ABC \sim \triangle PQR$, with $\frac{BC}{QR} = \frac{1}{4}$, then $\frac{\text{ar}(\triangle PQR)}{\text{ar}(\triangle ABC)}$ is equal to:
- (a) 4 (b) 16 (c) $\frac{1}{4}$ (d) $\frac{1}{16}$
16. If P, Q, R are respectively the mid-points of the sides BC, CA, AB of a $\triangle ABC$, then the ratio of the areas of the $\triangle PQR$ to the $\triangle ABC$ is:
- (a) 1 : 2 (b) 2 : 1 (c) 1 : 4 (d) 4 : 1
17. If a chord of a circle of radius 8 cm subtends a right angle at the centre, then the length of the chord is :
- (a) 8 cm (b) 16 cm (c) $16\sqrt{2}$ cm (d) $8\sqrt{2}$ cm

18. The lengths of the diagonals of a rhombus are 6 cm and 8 cm. Then the perimeter of the rhombus is :

(a) 5 cm (b) 10 cm (c) 15 cm (d) 20 cm

19. In the adjoining figure, if $AE \perp BC$ and $CD \perp AB$, then $\frac{BE}{BD}$ is equal to :

(a) $\frac{AD}{EC}$ (b) $\frac{AE}{CD}$ (c) $\frac{BC}{AB}$ (d) $\frac{CD}{AE}$



20. D is a point on the side BC of a triangle ABC such that $\angle ADC = \angle BAC$, then :

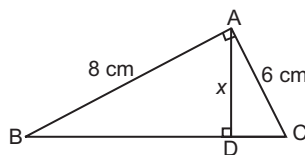
(a) $CA^2 = BC \cdot CD$ (b) $BC^2 = CA \cdot CD$
(c) $CD^2 = CA \cdot BC$ (d) none of these

21. If in a triangle ABC, a line segment XY parallel to AC divides the triangle into two parts equal in area, then $\frac{AX}{AB}$ is equal to :

(a) $\frac{1}{\sqrt{2}}$ (b) 2 (c) $1 - \frac{1}{\sqrt{2}}$ (d) $\sqrt{3}$

22. In the given figure, the value of x is :

(a) 6 cm (b) 7 cm
(c) 4.8 cm (d) 5.2 cm



23. A vertical stick 30 m long casts a shadow 15 m long on the ground. At the same time a tower casts a shadow 75 m long on the ground. The height of the tower is :

(a) 150 m (b) 130 m (c) 125 m (d) 120 m

24. The length of altitude of an equilateral triangle of side a is :

(a) $\frac{2a}{\sqrt{3}}$ (b) $\frac{\sqrt{3}}{2a}$ (c) $\frac{a\sqrt{3}}{2}$ (d) $\frac{a}{2\sqrt{3}}$

25. The length of the hypotenuse of an isosceles right triangle whose one side is $4\sqrt{2}$ cm, is :

(a) 11 cm (b) 9 cm (c) 8 cm (d) $5\sqrt{2}$

26. In an equilateral triangle ABC, if $AD \perp BC$, then :

(a) $3AB^2 = 2AD^2$ (b) $3AB^2 = 4AD^2$ (c) $4AB^2 = 3AD^2$ (d) $2AB^2 = 3AD^2$

27. $\triangle ABC$ is an isosceles triangle with $AB = AC = 13$ cm. The length of the altitude from A on BC is 5 cm. Then BC =

(a) 36 cm (b) 32 cm (c) 24 cm (d) 20 cm

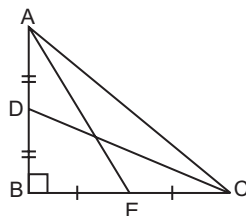
28. In a rhombus of side 10 cm, one of the diagonals is 12 cm long. The length of the second diagonal is :

(a) 18 cm (b) 16 cm (c) 14 cm (d) 12 cm

29. The diagonals of a rhombus are 15 cm and 36 cm long. Then its perimeter is :
 (a) 82 cm (b) 80 cm (c) 78 cm (d) 76 cm
30. The hypotenuse of a right triangle is 25 cm and out of the remaining two sides, one is longer than the other by 5 cm. The length of the other two sides are :
 (a) 10 cm, 15 cm (b) 15 cm, 20 cm (c) 15 cm, 18 cm (d) 20 cm, 22 cm
31. If in $\triangle ABC$, $\angle BCA$ is a right angle, if Q is the mid-point of side BC, $AC = 4$ cm, $AQ = 5$ cm. Then $AB^2 =$
 (a) 36 cm^2 (b) 42 cm^2 (c) 50 cm^2 (d) 52 cm^2

32. D is a point on the side BC of an equilateral $\triangle ABC$ such that $DC = \frac{1}{4} BC$. Then $AD^2 =$
 (a) $11 CD^2$ (b) $12 CD^2$ (c) $13 CD^2$ (d) $15 CD^2$
33. In an equilateral triangle ABC, D is a point on the side BC such that $4BD = BC$. Then :
 (a) $11 AD^2 = 13 BC^2$ (b) $16 AD^2 = 13 BC^2$
 (c) $15 AD^2 = 13 BC^2$ (d) $16 AD^2 = 11 BC^2$

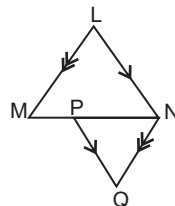
34. In the given figure, ABC is a right triangle with $\angle B = 90^\circ$. Median CD and AE are respectively of lengths $\sqrt{20}$ cm and 5 cm. The length of hypotenuse AC =
 (a) 11 cm (b) 9 cm
 (c) 6 cm (d) 4 cm



35. The areas of two similar triangles are 121 cm^2 and 64 cm^2 respectively. If the medians of the first triangle is 12.1 cm, then the corresponding median of the other triangle is :
 (a) 6.8 cm (b) 0.8 cm (c) 11.2 cm (d) 12.6 cm

36. In the given figure, $LM \parallel NQ$ and $LN \parallel PQ$. If $MP = \frac{1}{3} MN$, then the ratio of the areas of $\triangle LMN$ and $\triangle QNP$ is :

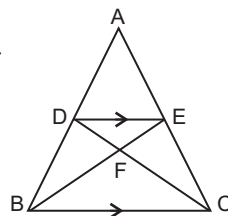
- (a) 9 : 4 (b) 16 : 4
 (c) 25 : 16 (d) 64 : 9



37. In a trapezium ABCD, $AB \parallel CD$ and $AB = 2CD$. If the area of $\triangle AOB = 84 \text{ cm}^2$, then the area of $\triangle COD =$
 (a) 18 cm^2 (b) 20 cm^2 (c) 20.5 cm^2 (d) 21 cm^2

38. In the given figure, $DE \parallel BC$ and $AD : DB = 5 : 4$. The ratio of ar ($\triangle DFE$) : ar($\triangle CFB$) is :

- (a) 25 : 81 (b) 16 : 9
 (c) 9 : 16 (d) 64 : 25



39. If the area of the equilateral triangle described on the side of a square is 48 cm^2 , then the area of equilateral triangle described on its diagonal is :
 (a) 46 cm^2 (b) 68 cm^2 (c) 76 cm^2 (d) 96 cm^2
40. X and Y are points on the sides AB and BC respectively of $\triangle ABC$ such that $XY \parallel AC$ and XY divides $\triangle ABC$ into two parts equal in area. Then $\frac{AX}{AB}$ is :

$$(a) \frac{3-\sqrt{3}}{3}$$

$$(b) \frac{2-\sqrt{2}}{2}$$

$$(c) \frac{\sqrt{2}}{2}$$

$$(d) \frac{\sqrt{3}}{3}$$

41. D, E and F are the mid-points of the sides BC, CA and AB respectively of $\triangle ABC$. Then the ratio of the areas of $\triangle DEF$ and $\triangle ABC$ is :

$$(a) 1 : 4$$

$$(b) 4 : 1$$

$$(c) 1 : 3$$

$$(d) 1 : 9$$

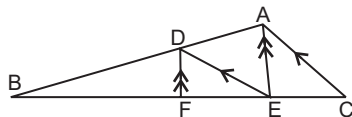
42. In the given figure, $DE \parallel AC$ and $DF \parallel AE$. If the lengths of BF and FE are 4 cm and 5 cm respectively, then the length of EC is :

$$(a) 11.25 \text{ cm}$$

$$(b) 9.6 \text{ cm}$$

$$(c) 12.5 \text{ cm}$$

$$(d) 13.2 \text{ cm}$$



43. In $\triangle ABC$, D and E are points on the sides AB and AC respectively such that $DE \parallel BC$. If $AD = 4x - 3$, $AE = 8x - 7$, $BD = 3x - 1$ and $CE = 5x - 3$, then the value of x is :

$$(a) 3 \text{ cm}$$

$$(b) 2 \text{ cm}$$

$$(c) 1.5 \text{ cm}$$

$$(d) 1 \text{ cm}$$

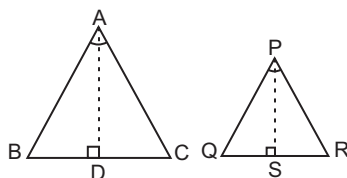
44. In the given figure, $\triangle ABC$ and $\triangle PQR$ are isosceles triangles in which $\angle A = \angle P$. If $\frac{\text{ar}(\triangle ABC)}{\text{ar}(\triangle PQR)} = \frac{9}{16}$, then $\frac{AD}{PS}$ is :

$$(a) \frac{2}{3}$$

$$(b) \frac{3}{4}$$

$$(c) \frac{5}{9}$$

$$(d) \frac{7}{81}$$



45. In an equilateral $\triangle ABC$, D is a point on side BC such that $BD = \frac{1}{3} BC$. Then

$$(a) 9AD^2 = 7AB^2$$

$$(b) 7AD^2 = 9AB^2$$

$$(c) 13AD^2 = 11AB^2$$

$$(d) 17AB^2 = 13AD^2$$

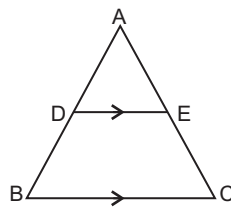
46. In the figure, $DE \parallel BC$, $AD = 1 \text{ cm}$, $BD = 2 \text{ cm}$. The ratio of the area ($\triangle ABC$) to the area ($\triangle ADE$) is :

$$(a) 9 : 1$$

$$(b) 16 : 1$$

$$(c) 64 : 1$$

$$(d) 1 : 81$$



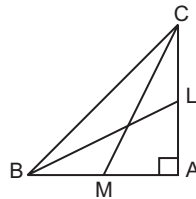
47. The figure, BL and CM are medians of a $\triangle ABC$ right angled of A. $4(BL^2 + CM^2)$ is :

$$(a) 6 BC^2$$

$$(b) 5 BC^2$$

$$(c) 13 BC^2$$

$$(d) 11 BC^2$$



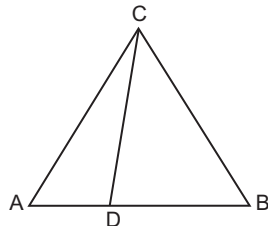
48. In the figure, if $\angle ACB = \angle CDA$, $AC = 6 \text{ cm}$ and $AD = 3 \text{ cm}$, then the length of AB is :

$$(a) 8 \text{ cm}$$

$$(b) 10 \text{ cm}$$

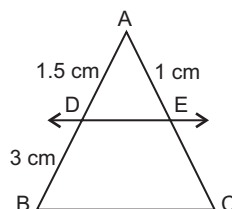
$$(c) 12 \text{ cm}$$

$$(d) 14 \text{ cm}$$



49. In the given figure, if $DE \parallel BC$, then length of EC is :

- (a) 5 cm (b) 4 cm
(c) 3 cm (d) 2 cm



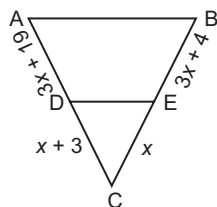
50. The sides of two similar triangles are in the ratio 2 : 3, then the areas of these triangles are in the ratio :

- (a) 4 : 9 (b) 2 : 3 (c) 8 : 27 (d) 16 : 81

II. FILL IN THE BLANKS

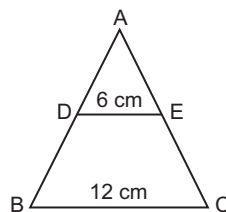
- The areas of two similar triangles $\triangle ABC$ and $\triangle PQR$ are 25 cm^2 and 49 cm^2 respectively. If $QR = 9.8 \text{ cm}$, then $BC =$ _____.
- $\triangle PQR \sim \triangle ABC$ such that $\text{area}(\triangle PQR) = 4 \text{ area}(\triangle ABC)$. The ratio of their perimeters = _____.
- The areas of two similar triangles are 81 cm^2 and 49 cm^2 respectively. The ratio of their corresponding altitudes and medians are _____.
- Hypotenuse of a right triangle is 25 cm and out of the remaining two sides, one is longer than the other by 5 cm. The lengths of the other two sides are _____.

5. If the figure, the value of x for which $DE \parallel AB =$ _____.



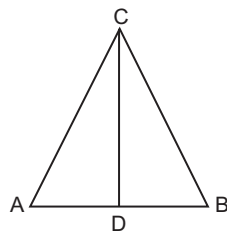
- Diagonals of a trapezium PQRS intersect each other at point O, $PQ \parallel RS$ and $PQ = 3 RS$. The ratio of the areas of triangle POQ and ROS is _____.
- Altitudes of an equilateral triangle of side 8 cm is _____.

8. In the given figure, if $DE \parallel BC$, then the ratio of area ($\triangle ADE$) and area (ECBD) = _____.



- ABCD is a trapezium in which $AB \parallel DC$ and P and Q are points on AD and BC respectively such that $PQ \parallel DC$. If $PD = 18 \text{ cm}$, $BQ = 35 \text{ cm}$ and $QC = 15 \text{ cm}$, then $AD =$ _____.
- Corresponding sides of two similar triangles are in the ratio of 2 : 3. If the area of the smaller triangle is 48 cm^2 , then the area of the larger triangle is _____.
- Areas of two similar triangles are 36 cm^2 and 100 cm^2 . If the length of a side of the larger triangle is 20 cm, then the length of the corresponding side of the smaller triangle is _____.

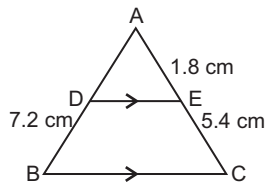
12. In the given figure, if $\angle ACB = \angle CDA$, $AC = 8$ cm and $AD = 3$ cm; then length of $BD =$ _____.



13. A 15 metres high tower casts a shadow 24 metres long at a certain time and at the same time, a telephone pole casts a shadow 16 metres long. Then the height of the telephone pole = _____. [NCERT(EP)]
14. Foot of a 10 m long ladder leaning against a vertical wall is 6 m away from the base of the wall. Then the height of the point on the wall whose top of the ladder reaches = _____. [NCERT(EP)]

III. VERY SHORT ANSWER QUESTIONS

- When do we say that two figures are congruent?
- What are similar figures?
- Two polygons of the same number of sides are similar if their corresponding angles are equal. Is it true?
- State Basic Proportionality Theorem.
- State SAS similarity criterion for two triangles.
- How the areas of two similar triangles are related to each other?
- State Pythagoras Theorem.
- State the converse of Pythagoras Theorem.
- In a triangle PQR , $PQ^2 + QR^2 = PR^2$. Which angle of $\triangle PQR$ is right angled?
- Is the triangle with sides 25 cm, 5 cm and 24 cm a right triangle?
- D is a point on side QR of $\triangle PQR$ such that $PD \perp QR$. Will it be correct to say that $\triangle PQD \sim \triangle PRD$?
- In the figure, $DE \parallel BC$. Find the length of side AD given that $AE = 1.8$ cm, $BD = 7.2$ cm and $CE = 5.4$ cm. [CBSE 2019]



ANSWER

I. Multiple Choice Questions :

1. (d) 2. (b) 3. (c) 4. (b) 5. (c) 6. (a) 7. (d) 8. (b) 9. (b) 10. (a) 11. (b)
12. (c) 13. (a) 14. (c) 15. (b) 16. (c) 17. (d) 18. (d) 19. (b) 20. (a) 21. (c) 22. (c)
23. (b) 24. (c) 25. (c) 26. (b) 27. (c) 28. (b) 29. (c) 30. (b) 31. (d) 32. (c) 33. (b)
34. (c) 35. (b) 36. (a) 37. (d) 38. (a) 39. (d) 40. (b) 41. (a) 42. (a) 43. (d) 44. (b)
45. (a) 46. (a) 47. (b) 48. (c) 49. (d) 50. (a)

II. Fill in the Blanks :

1. 7 cm 2. 2 : 1 3. $\frac{9}{7}$ 4. 15 cm, 20 cm 5. $x = 2$ 6. 9 : 1 7. $4\sqrt{3}$ cm
8. 1 : 3 9. 60 cm 10. 108 cm^2 11. 12 m 12. $\frac{55}{3}$ m 13. 10 m 14. 8 m

III. Very Short Answer Questions :

9. $\angle Q$ 10. No 11. No 12. 2.4 cm