

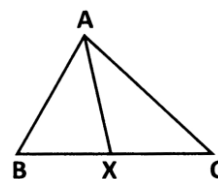
Triangles

Multiple Choice Questions

1. In a $\triangle ABC$, if $AB^2 = BC^2 + AC^2$, at which vertex is the right angle?
(a) A (b) B
(c) C (d) Either A or B
2. Which type of triangle is formed by $BC = 7.2\text{ cm}$, $AC = 6\text{ cm}$ and $\angle C = 120^\circ$?
(a) An acute angled triangle.
(b) An obtuse angled triangle.
(c) A right angled triangle.
(d) An isosceles triangle.
3. Which triangle is formed by $AB = 3\text{ cm}$, $BC = 4\text{ cm}$ and $AC = 8\text{ cm}$?
(a) A scalene triangle.
(b) An isosceles triangle.
(c) An equilateral triangle.
(d) No triangle is formed.
4. If two angles in a triangle are 65° and 85° , what is the third angle?
(a) 30° (b) 45°
(c) 60° (d) 90°
5. If one angle is the average of the other two angles and the difference between the greatest and least angles is 60° , which triangle is formed?
(a) An isosceles triangle.
(b) An equilateral triangle.
(c) A right angled triangle.
(d) A right angled isosceles triangle.
6. In $\triangle ABC$, if $AB = BC$ and $\angle B = 80^\circ$ what is the measure of $\angle C$?
(a) 50° (b) 100°
(c) 130° (d) 180°
7. Which triangle is formed by $BC = AC = 7.2\text{ cm}$ and $\angle C = 90^\circ$?
(a) A right angled triangle.
(b) An isosceles triangle.
(c) A right angled isosceles triangle.
(d) No triangle is formed.
8. Which of the following statements is false?
(a) The sum of two sides of a triangle is greater than the third side.
(b) In a right angled triangle, hypotenuse is the longest side.
(c) A, B and C are collinear if $AB + BC = AC$.
(d) The sum of angles in a triangle is less than 180° .
9. What is the length of the hypotenuse of a right angled triangle whose two legs measure 12 cm and 0.35 m ?
(a) 37 cm (b) 3.72 cm
(c) 0.372 cm (d) 37 m
10. If the two legs of a right angled triangle are equal and the square of the hypotenuse is 100 sq units , what is the length of each leg?
(a) 10 units (b) $5\sqrt{2}\text{ units}$
(c) $10\sqrt{2}\text{ units}$ (d) 15 units

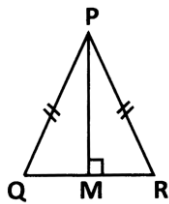
11. In a $\triangle PQR$, $PQ = PR$ and $\angle Q$ is twice that of $\angle P$. What is the measure of $\angle Q$?
- (a) 72° (b) 36°
(c) 144° (d) 108°
12. If two sides of an isosceles triangle are 3 cm and 8 cm, what is the length of the third side?
- (a) 3 cm (b) 8 cm,
(c) 3 cm or 8 cm, (d) Neither (A) nor (B)
13. If in a $\triangle ABC$, $\angle A = 60^\circ$ and $AB = AC$, of what type is $\triangle ABC$?
- (a) An isosceles triangle.
(b) A right angled triangle.
(c) An isosceles right angled triangle.
(d) An equilateral triangle.
14. In a $\triangle ABC$, if $AB + BC = 10\text{cm}$, $BC + CA = 12\text{cm}$, $CA + AB = 16\text{cm}$, what is the sum of the lengths of its sides?
- (a) 19 cm (b) 17 cm
(c) 38 cm (d) 30 cm
15. Which of the following are the angles in a right angled triangle other than the right angle?
- (a) Acute angles (b) Obtuse angles
(c) Right angles (d) Reflex angles
16. In a $\triangle ABC$, if $\angle A = \angle B + \angle C$, what is the measure of $\angle A$?
- (a) 60° (b) 45°
(c) 90° (d) 135°
17. If a, b and c are the sides of a triangle, which of the following is correct?
- (a) $a - b > c$ (b) $c > a + b$
(c) $c = a + b$ (d) $b < c + a$
18. If the angles of a triangle are in the ratio 1 : 2 : 7, what type of a triangle is it?
- (a) An acute angled triangle.
(b) An obtuse angled triangle.
(c) A right angled triangle.
(d) A right angled isosceles triangle.
19. A triangle always has
- (a) exactly one acute angle,
(b) exactly two acute angles.
(c) at least two acute angles. .
(d) exactly 2 right angles.
20. How many independent measurements are required to construct a triangle?
- (a) 3 (b) 4
(c) 2 (d) 5
21. In a $\triangle ABC$, if $\angle B$ is an obtuse angle, which is the longest side?
- (a) AB (b) BC
(c) AC (d) Either (A) or (B)
22. If P: An isosceles triangle is right angled.
Q : $\angle A = \angle B = 45^\circ$ and $\angle C = 90^\circ$ which of the following statements is true?
- (a) P is true and Q is the correct explanation of P.
(b) P is true and Q is not the correct explanation of P.
(c) P is false.
(d) P is the correct explanation of Q.
23. An isosceles triangle can be obtuse angled.
- (a) Always false.

- (b) Always true.
(c) Cannot be determined.
(d) Sometimes false.
- 24.** Which of the following statements is correct?
(a) The difference of any two sides is less than the third side.
(b) A triangle cannot have two obtuse angles.
(c) A triangle cannot have an obtuse angle and a right angle.
(d) All the above.
- 25.** Two chimneys 18m and 13m high stand upright on a ground. If their feet are 12m apart, what is the distance between their tops?
(a) 5m (b) 31m
(c) 13m (d) 18m
- 26.** The top of a broken tree touches the ground at a distance of 15 m from its base. If the tree is broken at a height of 8 m from the ground, what is the actual height of the tree?
(a) 20m (b) 25m
(c) 30m (d) 17m
- 27.** What is the ratio in which the centroid of a triangle divides the medians?
(a) 1 : 2 (b) 1 : 3
(c) 2 : 1 (d) 3 : 1
- 28.** The centroid of a triangle is the point of concurrence of which of these?
(a) Angle bisectors
(b) Perpendicular bisectors
(c) Altitudes
(d) Medians
- 29.** Which of the following statements is true?
(a) The centroid of an acute angled triangle lies in the interior of the triangle.
(b) The ortho centre of an acute angled triangle lies in the interior of the triangle.
(c) The medians of a triangle are concurrent.
(d) All the above.
- 30.** In $\triangle ABC$, D is the midpoint of BC and G is the centroid of the triangle. If $GD = 2\text{ cm}$, what is the length of AD ?
(a) 4 cm (b) 6 cm
(c) 2 cm (d) 8 cm
- 31.** In a $\triangle ABC$, E is the midpoint of AC and G is the centroid of the triangle. What is $BE : GE$?
(a) 1 : 2 (b) 2 : 1
(c) 3 : 1 (d) 1 : 3
- 32.** Which of the following statements is true?
(a) The ortho centre of a right angled triangle is the vertex containing the right angle.
(b) The median of a triangle joins a vertex to the midpoint of the opposite side.
(c) The centroid of a right angled triangle lies in the interior of the triangle.
(d) All the above.
- 33.** In a scalene triangle ABC , X is the midpoint of BC . What is AX ?

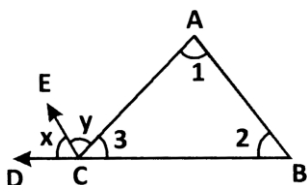


- (a) Median (b) Altitude
(c) Centroid (d) Ortho centre

34. In $\triangle PQR$, $PQ = PR$; M is a point on QR and $PM \perp QR$. What do you call PM?



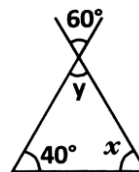
- (a) Centroid
(b) Median
(c) Altitude
(d) Vertex
35. In $\triangle XYZ$, XP is the median. Which of the following is correct?
- (a) $XP = XY$
(b) $YP = PZ$
(c) $XP = XZ$
(d) $XY = XZ$
36. From the figure given, which of the following statements is true?



- (a) $\angle x + \angle y = \angle 1 + \angle 3$
(b) $\angle y = \angle 2$
(c) $\angle x = \angle 1$
(d) $\angle x + \angle y = \angle 1 + \angle 2$
37. The exterior angle of a triangle is 110° . If one of the interior opposite angles is 55° , what is the measure of the other?
- (a) 45°
(b) 65°
(c) 55°
(d) 35°
38. In $\triangle PQR$, $\angle Q = 90^\circ$. Which of the following is the longest side?
- (a) RQ
(b) PQ
(c) PR
(d) Either (A) or (B)

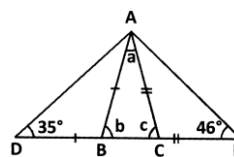
39. Which of the following statements is NOT true?
- (a) A triangle can have three 60° angles.
(b) A triangle can have a right angle.
(c) A triangle can have two right angles.
(d) A triangle can have all three angles equal.

40. From the following figure, what are the respective values of x and y?

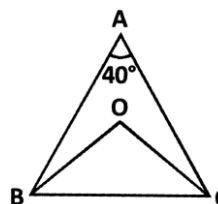


- (a) $80^\circ, 60^\circ$
(b) $60^\circ, 40^\circ$
(c) $60^\circ, 80^\circ$
(d) $40^\circ, 60^\circ$
41. Angles of a triangle are $(x + 10^\circ)$, $(x + 40^\circ)$ and $(2x - 30^\circ)$. What is the value of x?
- (a) 30°
(b) 40°
(c) 20°
(d) 10°

42. In the figure given, what are the values of $\angle b$, $\angle c$ and $\angle a$ respectively?



- (a) $18^\circ, 70^\circ$ and 92°
(b) $92^\circ, 70^\circ$ and 18°
(c) $70^\circ, 92^\circ$ and 18°
(d) $70^\circ, 18^\circ$ and 92°
43. In $\triangle ABC$, $AB = AC$, $\angle A = 40^\circ$, O is a point inside $\triangle ABC$ such that $\angle OBC = \angle OCA$. Find the measure of $\angle BOC$.



- (a) 110° (b) 35°
 (c) 140° (d) 155°

44. The triangle XYZ is right angled at X .Which is the longest side of $\triangle XYZ$?

- (a) XY (b) XZ
 (c) ZX (d) YZ

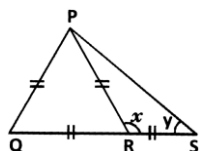
45. Which of the following statements is correct?

- (a) The exterior angle of a triangle is equal to its interior adjacent angle.
 (b) The median of a triangle joins its vertex to the midpoint of its opposite side.
 (c) The altitude of a triangle is drawn from a vertex to the midpoint of the opposite side.
 (d) All the above.

46. What is the number of medians in a triangle?

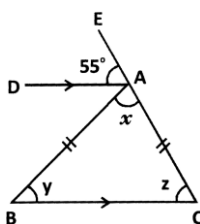
- (a) 0 (b) 2
 (c) 3 (d) 1

47. Find the measure of y in the given figure.



- (a) 30° (b) 60°
 (c) 90° (d) 120°

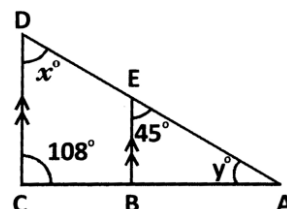
48. A In the figure, $AB = AC$ and $AD \parallel BC$ Find the respective measures of x, y and z.



- (a) $x = 70^\circ, y = 70^\circ, z = 55^\circ$

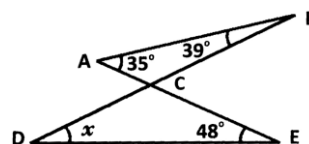
- (b) $x = 70^\circ, y = 55^\circ, z = 55^\circ$
 (c) $x = 55^\circ, y = 55^\circ, z = 55^\circ$
 (d) $x = 70^\circ, y = 55^\circ, z = 70^\circ$

49. Find the angles x and y respectively.



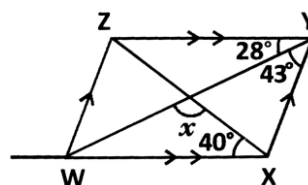
- (a) $x = 47^\circ, y = 25^\circ$ (b) $x = 27^\circ, y = 45^\circ$
 (c) $x = 45^\circ, y = 27^\circ$ (d) $x = 25^\circ, y = 47^\circ$

50. Find the value of x.



- (a) 106° (b) 53°
 (c) 26° (d) 52°

51. Find the measure of x in the following figure.



- (a) 112° (b) 56°
 (c) 68° (d) 106°

Solution

1. (C) AB is the hypotenuse
 \Rightarrow C has the right angle.
2. (B) Since $\angle C = 120^\circ > 90^\circ$, the triangle formed is obtuse.
3. (D) The sum of any two sides is greater than the third side.
 Since $AB + BC < AC$, no triangle is formed.
4. (A) Since sum of the angles in a triangle $= 180^\circ$
 $65^\circ + 85^\circ + x = 180^\circ \Rightarrow x = 30^\circ$
 \therefore Third angle $= 30^\circ$
5. (C) Let the least angle be x° .
 The greatest angle $= x^\circ + 60^\circ$

$$\text{Third angle} = \frac{x + x + 60^\circ}{2} = x + 30^\circ$$
 We have,

$$x + x + 30^\circ + x + 60^\circ = 180^\circ$$

$$\Rightarrow 3x + 90^\circ = 180^\circ \Rightarrow x = 30^\circ$$
 \therefore The angles are $30^\circ, 60^\circ$ and 90° .
 Since one of the angles is 90° , the triangle formed is a right angled triangle.
6. (A) Not available
7. (C) Not available
8. (D) Not available
9. (A) Not available
10. (B) We have, by Pythagoras' theorem,

$$x^2 + x^2 = 100$$

$$\Rightarrow x = \sqrt{50} = \sqrt{25 \times 2} = 5\sqrt{2}$$

11. (A) Since $PQ = PR$, $\angle Q = \angle R$

Given that $\angle Q = 2 \angle P$, we have

$$\angle P + \angle Q + \angle R = 180^\circ$$

$$\Rightarrow \frac{\angle Q}{2} + \angle Q + \angle Q = 180^\circ$$

$$\Rightarrow \frac{5}{2} \angle Q = 180^\circ \Rightarrow \angle Q = 72^\circ$$

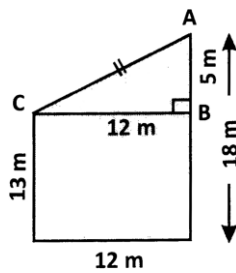
12. (B) Length of the third side should be 8 cm, because if we take third side as 3 cm, then the sum of two sides $3 \text{ cm} + 3 \text{ cm} = 6 \text{ cm}$ is less than third side.
13. (D) Not available
14. (A) Not available
15. (A) Not available
16. (C) Not available
17. (D) Not available
18. (B) Let the measures of the angles be $1x, 2x$ and $7x$.
 We have, $1x + 2x + 7x = 180^\circ$
 $\Rightarrow x = 18^\circ$
 The angles are $18^\circ, 36^\circ$ and 126° .
 \therefore The triangle is obtuse angled.
19. (C) Not available
20. (A) Not available
21. (C) Not available
22. (A) Not available

23. (D) An isosceles triangle can be obtuse angled but it may not be true always:

e.g., a triangle with angle measures $91^\circ, 45^\circ, 45^\circ$, is both isosceles and obtuse but the triangle cannot be formed as the sum of the angles is greater than 180° .

24. (D) According to the properties of a triangle, all the given statements are true.

25. (C)



To find the distance between the tops of chimneys, we have to find AC.

By Pythagoras' theorem,

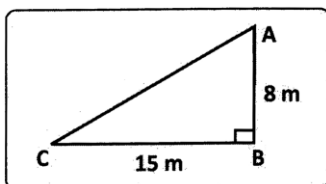
$$AC^2 = AB^2 + BC^2$$

(Since $\triangle ABC$ is a right triangle.)

$$\Rightarrow AC^2 = 5^2 + 12^2 = 169$$

$$\Rightarrow AC = \sqrt{169} = 13\text{ m}$$

26. (B)



Since $\triangle ABC$ is right angled,

$$AC^2 = AB^2 + BC^2$$

$$\Rightarrow AC^2 = 8^2 + 15^2 = 289$$

$$\Rightarrow AC = \sqrt{289} = 17\text{ m}$$

\therefore Actual length of tree

$$= AB + AC = 25\text{ m}$$

27. (C) Not available
28. (D) Not available
29. (D) Not available
30. (B) The centroid divides the median in the ratio

2 : 1.

$$\therefore AG : GD = 2 : 1$$

$$\text{So, } AG = 2 \times GD = 2 \times 2 = 4\text{ cm}$$

$$AD = AG + GD = 4 + 2 = 6\text{ cm}$$

31. (C) Since G divides BE in the ratio 2 : 1,
 $BE : GE = 3 : 1$.

32. (D) Not available

33. (A) Not available

34. (C) Not available

35. (B) Since XP is the median, P is the midpoint of YZ. So, $YP = PZ$.

36. (D) $\angle x + \angle y$ forms the exterior angle of $\triangle ABC$, which is equal to the sum of interior opposite angles $\angle 1$ and $\angle 2$.

37. (C) Not available

38. (C) Not available

39. (C) Not available

40. (A) 60° & y are vertically opposite angles which are equal

$$\Rightarrow y = 60^\circ$$

In the triangle,

$$x + 60^\circ + 40^\circ = 180^\circ$$

(Angle sum property)

$$\Rightarrow x = 180^\circ - 100^\circ = 80^\circ$$

- 41.** (B) Given that the angles of the triangle are $(x + 10^\circ)$, $(x + 40^\circ)$ and $(2x - 30^\circ)$.

Sum of the angles of a triangle = 180°

$$\Rightarrow x + 10^\circ + x + 40^\circ + 2x - 30^\circ = 180^\circ$$

$$\Rightarrow 4x = 160^\circ$$

$$\Rightarrow x = 40^\circ$$

- 42.** (C) Given $AB = BD$

$$\Rightarrow \angle BAD = \angle BDA = 35^\circ$$

$$\angle b = \angle BDA + \angle BAD$$

$$\Rightarrow \angle b = 35^\circ + 35^\circ = 70^\circ$$

Also given $AC = CE$

$$\Rightarrow \angle CAE = \angle CEA = 46^\circ$$

Using exterior angle property,

$$\Rightarrow \angle c = \angle CAE + \angle CEA$$

$$= 46^\circ + 46^\circ = 92^\circ$$

In $\triangle ABC$, $\angle a + \angle b + \angle c = 180^\circ$

$$\Rightarrow \angle a = 180^\circ - \angle b - \angle c$$

$$\Rightarrow \angle a = 180^\circ - 70^\circ - 92^\circ = 18^\circ$$

$$\therefore \angle a = 18^\circ, \angle b = 70^\circ \text{ and } \angle c = 92^\circ$$

- 43.** (A) Given, $AB = AC$

$$\Rightarrow \angle ABC = \angle ACB$$

Also $\angle OBC = \angle OCA$

\Rightarrow OB and OC are angular bisectors

$$\therefore \angle BOC = 90^\circ + \frac{\angle A}{2}$$

$$= 90^\circ + \frac{40^\circ}{2} = 90^\circ + 20^\circ = 110^\circ$$

- 44.** (D) Not available

- 45.** (B) Not available

- 46.** (C) Not available

- 47.** (A) Not available

- 48.** (B) Not available

- 49.** (C) Given $BE \parallel CD$, $x^\circ = 45^\circ$.

(Corresponding angles)

In $\triangle ACD$, $x^\circ + y^\circ + 108^\circ = 180^\circ$

(Angle sum property.)

$$\Rightarrow 45^\circ + y + 108^\circ = 180^\circ$$

$$\Rightarrow y = 180^\circ - 153^\circ = 27^\circ$$

$$\therefore x = 45^\circ, y = 27^\circ$$

- 50.** (C) In $\triangle ABC$, $\angle ACB = \angle 180^\circ - (35^\circ + 39^\circ) = 180^\circ - 74^\circ = 106^\circ$

AE and BD intersect at C

$$\Rightarrow \angle DCE = \angle ACB = 106^\circ$$

(Vertically opposite angles)

$$\Rightarrow x = 180^\circ - (106^\circ + 48^\circ) = 26^\circ$$

- 51.** (A) $XW \parallel YZ$

$$\Rightarrow \angle YWX = \angle ZYW = 28^\circ$$

$$\Rightarrow x = 180^\circ - (40^\circ + 28^\circ)$$

$$= 180^\circ - 68^\circ = 112^\circ$$