## **EXERCISE # 1**

- Q.1 Classify the triangles as scalene, isosceles or equilateral, if their sides are :
  (i) 7 cm, 12 cm, 13 cm (ii) 6 cm, 6 cm, 6 cm (iii) 5 cm, 5 cm, 4 cm
- Q.2 Classify the triangles as acute, obtuse or right, whose angles are : (i) 150°, 10°, 20° (ii) 30°, 60°, 90° (iii) 80°, 40°, 60°
- Q.3 Observe the following figures and classify each of the triangles on the basis of their (a) sides (b) angles



- Q.4 Fill in the blanks with the correct word/symbol to make it a true statement :
  - (i) A triangle has ..... sides.
  - (ii) A triangle has ..... vertices.
  - (iii) A triangle has ..... angles.
  - (iv) A triangle has ..... parts.
  - (v) A triangle whose no two sides are equal is know as .....

Power by: VISIONet Info Solution Pvt. Ltd

- (vi) A triangle whose two sides are equal is known as .....
- (vii) A triangle one of whose angles is 90° is known as .....
- (viii) A triangle whose all the angles are of measure less than 90° is known as
- (ix) A triangle whose one angle is more than 90° is known as .....
- (x) A triangle whose all the sides are equal is known as .....
- Q.5 In each of the following, state if the statement is true (T) or false (F) :
  - (i) A triangle has three sides.
  - (ii) A triangle may have four vertices.
  - (iii) Any three line segments make up a triangle.
  - (iv) The interior of a triangle includes its vertices.
  - (v) The triangular region includes the vertices of the corresponding triangle.
  - (vi) The vertices of a triangle are three collinear points.
  - (vii)An equivalent triangle is an isosceles also.
  - (viii) Every right triangle is scalene.
  - (ix) Each acute triangle is an equilateral.
  - (x) No isosceles triangle is obtuse.
- **Q.6** Answer the following in "yes" or "no" :
  - (i) Can an isosceles triangle be a right triangle ?
  - (ii) Can a right triangle be a scalene triangle ?
  - (iii) Can a right triangle be an equilateral triangle?
  - (iv) Can an obtuse triangle be an isosceles triangle?
- **Q.7** Fill in the blanks with suitable words/symbols so as to make the statement true :
  - (i) A median of a triangle is the ..... that joins a vertex to the ...of the opposite side.
  - (ii) Medians of a triangle are .....
  - (iii) The point of concurrence of the medians of a triangle is called ...... of the triangle.

Mob no. : +91-9350679141

1

- (iv) The centroid of a  $\Delta$  lies in ..... of the triangle.
- (v) The centroid of a  $\Delta$  divides each median in the ratio .....
- Q.8 Fill in the blanks with suitable word(s)/symbol(s) to make each of the following statements correct :
  - (i) An altitude of a triangle is a ..... from a vertex ..... to the opposite side.
  - (ii) The point of concurrence of the altitudes (Produced, if necessary) of a triangle is called its .....
  - (iii) If  $\triangle ABC$  is right angled at C, then two of the altitudes of the triangle are ...... and .....
  - (iv) If H is the orthocentre of ΔABC, then BH is perpendicular to the line containing the side.....
  - (v) In a right triangle, the orthocentre is at
- Q.9 If in the  $\triangle ABC$ , D is the mid-point of  $\overline{BC}$ , and P is foot of the perpendicular from A to the side BC, then



- (i) AD is the ..... of  $\triangle ABC$ .
- (ii) AP is the ..... on side BC.
- (iii) Is  $m \overline{AD} = m \overline{AP}$  ?
- Q.10 Draw rough sketches for the following :
  - (i) In  $\triangle$ ABC, the medians BE and CF of the triangle.
  - (ii) In  $\Delta DEF$ , the medians EB and FA.
  - (iii) In  $\triangle PQR$ , the altitudes PM and QN.
  - (iv) In  $\Delta$ LMN, LP is an altitude lies in the exterior of the  $\Delta$ .



(i) What do you understand by the term median?

- (ii) What do you understand by the term midpoint of a line segment ?
- (iii) How many medians can a triangle have ?
- (iv) Does a median lie wholly in the interior of the triangle? If you think that this is not true, draw the figure and justify your answer.
- (v) Can you find the mid-point of a line? If no, justify your answer ?
- (vi) How many altitudes can a triangle have ?
- (vii) Will an altitude always lie in the interior of the triangle? If you think that this need not be true, draw a rough sketch to show such a case.
- (viii) Can you think of a triangle in which two altitudes of the triangle are its sides?
- (ix) Can the altitudes and medians be same for a triangle ?
- Q.12 Observe the following figure and complete the table :



Fig.	Exterior Angles	Corresponding Interior Angles	Adjacent Interior Angles
(i)			
(ii)			

Q.13 In figure, find the measures of x and y.



Q.14 In figure, find the values of x, y and z.

Power by: VISIONet Info Solution Pvt. LtdWebSite : www.edubull.comMob no. : +91-9350679141

2



**Q.15** In the figure,  $3 \angle BAD = \angle DBA$ . Find  $\angle CDB$ ,  $\angle DBC$  and  $\angle ABC$ .



Q.16 In the figure, find (i)  $\angle ACD$  (ii)  $\angle AED$ 



- Q.17 One of the exterior angles of a triangle is 145° and the interior opposite angles are in the ratio 2 : 3. Find the measure of angles of the triangle.
- **Q.18** The exterior angles PRS of a triangle PQR is 110° and if  $\angle Q = 75^\circ$ , find  $\angle P$ . Is  $\angle PRS > \angle P$ ?
- Q.19 Find the value of unknown angle in the following diagrams :



Q.20	In a	triangle,	find	the	third	angle	when	two
	given angles are :							

- (i)  $30^{\circ}, 60^{\circ}$
- (ii) 45°, 45°
- (iii) 25°, 70°
- Q.21 Observe the following table and state which measure forms a triangle :

	Massura of	Sum of	Does the measure,		
S.No.	angles	measure of angles	represent a ∆? if not, why?		
(i)	45°, 62°, 73°				
(ii)	46°, 54°, 80°				
(iii)	30°,40°,110°				
(iv)	45°, 61°, 75°				

**Q.22** Find the value of unknown variable in each of the following triangles :



Q.23 Find the values of the x, y and z in the following figures :



Power by: VISIONet Info Solution Pvt. Ltd		
WebSite : www.edubull.com	Mob no. : +91-9350679141	3



- **Q.24** In figure,  $\angle C = 50^{\circ}$  and  $\angle A = 55^{\circ}$ .  $\angle CBD$  is the exterior angle.
  - (i) Find the interior adjacent angle.
  - (ii) Find  $\angle$ CBD.
  - (iii) Mark interior opposite angles.



- **Q.25** One of angles of a triangle is 80°. The other two angles are equal. Find the measure of these angles.
- Q.26 In the following triangles, equal sides are marked with ||, find the value of x in each case :



Power by: VISIONet Info Solution Pvt. Ltd

WebSite : www.edubull.com

(ii)

Mob no. : +91-9350679141



Q.28 In figure, make a rough sketch of the triangle and name the angles that are equal.



**Q.29** All three sides of the large triangle are equal as shown in figure. Find the angles r and s.



**Q.30** Find the angles x, y and z in figure.



**Q.31** Find the angles f and g in fig.



- Q.32 Is it possible to have a triangle with the following side lengths ?
  (i) 2 cm, 3 cm, 5 cm (ii) 3 cm, 6 cm, 7 cm (iii) 6 cm, 3 cm, 2 cm
- Q.33 Is the sum of any two angles of a triangle always greater than the third angle ?
- **Q.34** Take any point O in the interior of a  $\triangle$ ABC in figure. Is :



- (i) OB + OC > BC?
- (ii) OC + OA > CA?
- (iii) OA + OB > AB?
- (iv) BC + CA + AB < 2 (OB + BC + OA)
- Q.35 AD is a median of triangle ABC in figure. Is AB + BC + CA > 2AD ?



- **Q.36** ABCD is a quadrilateral. Is AB + BC + CD + DA > AC + BD?
- Q.37 O is any point in the interior of a triangle PQR and QO produced meets PR at S (figure). Is



- (i) PQ + PS > OQ + OS?
- (iii) PQ + PS + SR > OQ + OS + SR?
- (iv) PQ + PR > OQ + OR?
- (v) PQ + QR + PR > OP + OQ + OR?
- Q.38 ABCD is a quadrilateral. Is AB + BC + CD + DA < 2(AC + BD)?
- **Q.39** The lengths of two sides of a triangle are 10 cm and 14 cm. Between what two measures should the length of the third side fall ?
- Q.40 How long should the hypotenuse be in the right-angled triangle in figure.





- Q.41 The sides of a certain triangles are given below. Determine which of them are right-angled triangles.
  - (i) 1.7 cm, 1.5 cm, 0.8 cm
  - (ii) 0.9 cm, 4 cm, 4.1 cm
  - (iii) 4 cm, 5.2 cm, 7 cm
  - (iv) 2.4 cm, 3.2 cm, 7.9 cm
  - (v) 1.8 cm, 8 cm, 8.2 cm
  - (vi) 5 cm, 5.25 cm, 7.25 cm
- Q.42 Find the lengths of the unknown side in these right-angled triangles.



**Q.43** Find the unknown length x in figure.



**Q.44** PQR is a right-angled triangle right-angled at P. If PQ = 14 cm, PR = 48 cm, find QR.

## **ANSWER KEY**

1. (i) Scalene tria	angle (ii) Equ	ilateral triangle	(iii) Isosceles tri	angle		
2. (i) Obtuse-ang	gled triangle	(ii) Right-angled	l triangle (iii) Ac	ute-angled triang	le	
<b>3.</b> (a) Sides : (i)	Isosceles triangl	e(ii) Scalene triar	ngle (iii) Iso	sceles triangle	(iv) Scalene tria	ngle
(v) Isosceles	triangle	(vi) Isosceles tri	angle			
(b) Angles :	(i) Acute-angled	triangle (ii) Rig	ht-angled triangle	e (iii) Obtuse-ang	led triangle	
(iv) Acute-an	ngled triangle	(v) Obtuse-angle	ed triangle	(vi) Right-angle	d triangle	
<b>4.</b> (i) three	(ii) three	(iii) three	(iv) six	(v) scalene	(vi) isosceles	
(vii) right tri	angle	(viii) acute trian	gle (ix) obt	use triangle	(x) equilateral	
<b>5.</b> (i) T	(ii) F	(iii) F	(iv) F	(v) T	(vi) F	(vii) F
(viii) F	(ix) F	(x) F				
<b>6.</b> (i) Yes	(ii) Yes	(iii) No	(iv) Yes			
7. (i) Line segme	ent, mid-point	(ii) concurrent	(iii) centroid	(iv) interior	(v) 2 : 1	
<b>8.</b> (i) Line segme	ent, perpendicula	r (ii) orth	ocentre	(iii) AC and BC	(iv) AC	
(v) the vertex	x containing the	right angle				
<b>9.</b> (i) Median	(ii) Perpendicula	ar (iii) No	$m\overline{AD} > m\overline{AP}$			
<b>11.</b> (iii) 3	(iv) Yes	(v) No, a line ha	s no end points.	(vi) 3 (vii) No	)	
(viii) Yes, (r	ight triangle)	(ix) Yes (in an e	quilateral triangle	e)		
<b>12.</b> For fig. (i) $\angle$	BAF; ∠ABC, ∠	ACB; ∠BAC	∠CBE; ∠BAC,	∠BCA; ∠ABC	∠ACD; ∠ABC,	∠BAC; ∠ACB
For fig. (ii) 2	∠FDR; ∠DEF, ∠	∠DFE; ∠EDF	∠DEQ; ∠EDF,	∠DFE; ∠DEF	$\angle$ EFP; $\angle$ EDF, $\angle$	∠DEF; ∠EFD
<b>13.</b> x = 105°, y =	= 45°	<b>14.</b> x = 100°, y =	= 145°, z = 35°	<b>15.</b> 72°, 60°, 114	4° <b>16.</b> (i) 1	135° (ii) 165°
<b>17.</b> 58°, 87°, 35°		18. 35°, yes	<b>19.</b> (i) 110°	(ii) 109°	(iii) 60°	
<b>20.</b> (i) 90°	(ii) 90° (iii) 85°	<sup>o</sup> <b>21.</b> (i) 180°, yes	(ii) 180°, yes	(iii) 180°, yes	(iv) 181°, No	
<b>22.</b> (i) 80°	(ii) 45°	(iii) 25°	<b>23.</b> (i) 60°, 50°,	70° (ii) 105	°, 105°, 45° (iii)	60°, 60°, 60°
<b>24.</b> (i) 75°	(ii) 105°	(iii) $\angle A$ and $\angle C$	<b>25.</b> 50°, 50°	<b>26.</b> (i) 60°	(ii) 45° (iii) 60°	' (iv) 100°
<b>27.</b> (i) 80°, 130°	(ii) 90°, 135°	(iii) 55°, 125°	<b>28.</b> (i) ∠B, ∠C	(ii) $\angle Q$ , $\angle R$	(iii) ∠D, ∠E	(iv) $\angle B$ , $\angle C$
<b>29.</b> 60°, 30°	<b>30.</b> $x = y = 65^{\circ}$ ,	$z = 120^{\circ}$	<b>31.</b> 80°, 140°	<b>32.</b> (i) No	(ii) Yes	(iii) No
<b>33.</b> No	<b>34.</b> (i) Yes	(ii) Yes	(iii) Yes	(iv) No	<b>35.</b> Yes	<b>36.</b> Yes
<b>37.</b> (i) Yes	(ii) Yes	(iii) Yes	(iv) Yes	(v) Yes	<b>38.</b> No	
<b>39.</b> Between 4 cr	m and 24 cm.	<b>40.</b> 13 feet	<b>41.</b> (i), (ii) , (v)	and (vi)		
<b>42.</b> (i) 5 cm	(ii) 12 cm	(iii) 25 cm	(iv) 8 cm	(v) 9 cm	<b>43.</b> 96	<b>44.</b> 50 cm
Power by: VISIONe WebSite : www.eduk	t Info Solution Pvt. I bull.com	Ltd Mob no. : +	91-9350679141			7

Power by: VISIONet Info Solution Pvt. Ltd WebSite : www.edubull.com

Mob no. : +91-9350679141

## EXERCISE # 2

- Q.1 An exterior angle of a triangle is of measure 80° and one of its interior angles is of measure 45°. Find the measure of the other interior opposite angle.
- **Q.2** If the two interior opposite angles of an exterior angle are complementary, then what is the measure of the exterior angle? Also write the type of the  $\Delta$ .
- **Q.3** If the measure of two interior opposite angles of an exterior angle are equal in magnitude and also complementary, then find the measure of the exterior angle and interior opposite angles.
- Q.4 The two interior opposite angles of an extrior angle of a triangle are 20° and 70°. Find the measure of the exterior angle.
- Q.5 Comment on the interior opposite angles, when the exterior angle is :
  - (i) an acute angle
  - (ii) an obtuse angle
  - (iii) a right angle
- Q.6 Can the exterior angles of a triangle be a straight angle ?
- Q.7 An exterior angle of a triangle is 135° and the interior opposite angles are in the ratio 1 : 4. Find the angles of the triangle.
- Q.8 In the following figure, find (i)  $m \angle 1$  (ii)  $m \angle 2$ (iii)  $m \angle 3$  (iv)  $m \angle 4$

65° 300

**Q.9** In the figure, find the values of x, y and z.



- **Q.10** Three angles of a  $\Delta$  are equal. Find the angles.
- Q.11 In the figure, BE  $\perp$  BC &  $\angle$ C = 70°,  $\angle$ EBD = 40°. Find  $\angle$ A and  $\angle$ CBA.



Q.12 In figure, find sum of the angles :  $\angle DOA + \angle OAB + \angle ABC + \angle BCD + \angle CDO$ . [Hint : Sum of angles asked in the question is equal to sum of the angles of all the triangles in the figure.]



- **Q.13** In a right-angled  $\Delta$ , one acute angle is of 35°, find the other acute angle.
- **Q.14** The angles of a  $\Delta$  are in the ratio 2 : 3 : 4. Find the angles.
- **Q.15** In a right-angled  $\Delta$ , one acute angle is twice the other, find the measure of angles.
- **Q.16** In a  $\Delta$ , two angles are of equal measure and the third angle is 20° more than equal angles. Find the angles.

Power by: VISIONet Info Solution Pvt. Ltd		
WebSite : www.edubull.com	Mob no. : +91-9350679141	9

- **Q.17** The acute angles of a right-angled  $\Delta$  are in the ratio 2 : 3. Find the angles of the triangle.
- **Q.18** The three angles of a  $\Delta$  are in the ratio 1 : 1 : 1. Find all the angles of the triangle. Classify the triangle in two different ways.
- Q.19 Think and state whether the following statements are true (T) or false (F). Also justify your answer.
  - (i) A triangle can have two right angles.
  - (ii) A triangle can have two obtuse angles.
  - (iii) Each angle of a triangle can be less than 60°.
  - (iv) A triangle can have all the three angles equal to  $60^{\circ}$ .
- **Q.20** In the figure,  $\angle BAC = 3 \angle ABC$ , and  $\angle ACD = 100^{\circ}$ , find  $\angle ABC$ :



- Q.21 A 10.10 m long ladder placed against a wall. The ladder reached a window 9.9 m height from the ground. Find the distance of the foot of the ladder from the wall.
- Q.22 Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, determine the distance between their tops.
- Q.23 If the square of the hypotenuse of an isosceles right-angled triangle is  $512 \text{ cm}^2$ , find the length of each side.
- Q.24 A ladder reaches a window which is 12 m above the ground on one side of the street. Keeping its foot at the same point, the ladder is turned to the other side of the street to reach a window 9 cm height. Find the width of the street if the length of the ladder is 15 m.

- Q.25 Using Pythagoras theorem, find the length of second diagonal of a rhombus whose side is 5 cm and one of the diagonals is 6 cm.
- **Q.26** A man goes 120 m due east and then 160 m due north. How far is he from the starting point ?
- **Q.27** ABC is an isosceles right-angled triangle, rightangled at C. Prove that  $AB^2 = 2AC^2$ .
- Q.28 ABC is a triangle, right angled at B. If AB = 12 cm and BC = 9 cm, find AC.
- Q.29 PQR is a triangle, right angled at R. If PQ = 26 cm, PR = 10 cm, find QR.
- Q.30 A ladder 25 m long reaches a window of a building 20 m above the ground (see figure below). Determine the distance of the foot of the ladder from the building.



- **Q.31** Which of the following can be the sides of a right triangle :
  - (i) 24 cm, 7 cm, 25 cm
  - (ii) 1.6 cm, 4 cm, 3.8 cm
  - (iii) 4 cm, 3 cm, 5 cm
- **Q.32** A tree is broken at a height of 2.5 m from the ground and its top touches the ground at a distance of 6 m from the base of the tree. Find the original height of the tree.
- **Q.33** Angles B and C of  $\triangle ABC$  are 40° and 50°. Write which of the following is true : (i)  $AB^2 + BC^2 = AC^2$ (ii)  $AC^2 + BC^2 = AB^2$ (iii)  $AB^2 + AC^2 = BC^2$
- Q.34 Find the perimeter of the rectangle whose length and a diagonal are 24 cm and 25 cm respectively.

Power by: VISIONet Info Solution Pvt. Ltd		
WebSite : www.edubull.com	Mob no. : +91-9350679141	10

- Q.35 A ladder 15 dm long reaches a window which is 12 dm above the ground on one side of a street. Keeping its foot at the same point, the ladder is turned to the other side of the street to reach a window 9 dm high. Find the width of the street.
- Q.36 A man goes 12 m due west and then 5 m due south. How far is he away from his initial position ?
- Q.37 Find the perimeter of the rhombus whose diagonals measure 24 cm and 10 cm.
- Q.38 In each of the following there are three positive numbers. State if these numbers could possibly be the lengths of the sides of a triangle :



- Q.39 In the following figure, D is the mid point on the side BC of  $\triangle$ ABC. Complete each of the following statements using symbol '=', '<' or '>' so as to make it true :
  - (i) AD \_\_\_\_\_ AB + BD
  - (ii) AD \_\_\_\_\_ AC + DC

R

(iii) AD 
$$\frac{1}{2}$$
 (AB + AC + BC)

D

- **Q.40** S is a point in the interior of  $\triangle PQR$  as shown in figure. State which of the following statements are true or false :
  - (i) PS + QS < PQ(ii) PS + SR > PR(iii) QS + SR = QRP R
- Q.41 The lengths of two sides of a triangle are 12 cm and 15 cm. Between what two measures should be length of the third side fall?
- **Q.42** In figure, PQR is a triangle and S is any point in its interior. Show that SQ + SR < PQ + PR.



[**Hint.** Produce QS which intersects PR at point T on producing]

## **ANSWER KEY 1.** 35° **2.** 90°, right triangle **3.** 90°, 45°, 45° 4.90° 6. No 7. 27°, 108°, 45° **8.** (i) 100° (ii) 80° **9.** $x = 110^{\circ}$ , $y = 70^{\circ}$ , $z = 110^{\circ}$ (iii) 50° (iv) 130° **10.** 60°, 60°, 60° 11. 60°, 50° **13.** 55° 14. 40°, 60°, 80° **12.** 540° **16.** $53\frac{1}{3}^{\circ}$ , $53\frac{1}{3}^{\circ}$ , $73\frac{1}{2}^{\circ}$ 15.30°, 60° 17. 36°, 54°, 90° **18.** 60°, 60°, 60° Acute-angled triangle (on the basis of angles) and Equilateral triangle (on the basis of sides) 19. (i) False (ii) False (iii) False (iv)True **20.** 25° **21.** 2m **22.** 13 m **23.** Each side = 16 cm **24.** 21 m 25.8 cm **26.** 200 m **28.** 15 cm **29.** 24 cm **30.** 15 m **31.** (i) Yes (ii) No (iii) Yes **32.** 9 m **33.** (iii) **34.** 62 cm **35.** 21 dm **36.** 13 m (iv) no **37.** 52 cm 38. (i) Yes (ii) Yes (iii) Yes **39.** (i) < (ii) < (iii) < 40. (i) F (ii) T (iii) F **41.** Between 3 cm and 27 cm