

## GEOMETRY (Ref: FM-QAH2022011)

## Triangles

- In a ΔABC, if AB, BC and AC are the three sides of the triangle, then which of the statements is necessarily true?
   a) AB + BC < AC</li>
   b) AB + BC > AC
   c) AB + BC = AC
   d) AB<sup>2</sup> + BC<sup>2</sup> = AC<sup>2</sup>
- 2. The sides of a triangle are 12 cm, 8 cm, and 6 cm respectively, the triangle is:
  a) acute
  b) obtuse
  c) right
  d) can't be determined
- 3. Which one of the following can not be the ratio of angles in a right-angled triangle?
  a) 1:2:3
  b) 1:1:2
  c) 1:3:6
  d) None of these
- 4. If sides of a  $\Delta$  are 9, 12 & x where x is the integer. For how many values of x, a triangle can be formed.
- 5. If sides of a quadrilateral are 5, 8, 10 & x where x is the integer. For how many values of x; quadrilateral can be formed.
- 6. If sides of a triangle are 8, 15 & x. for how many integer values of x the triangle will be
  a) acute
  b) obtuse
  c) Right angle
- 7. If the perimeter of a triangle is 14 and the sides are integers, then how many different triangles are possible?
  a) 6 b) 5 c) 4 d) 3
- 8. Perimeter of a ∆ with integer sides is equal to 15. How many such triangles are possible?
  a) 7 b) 6 c) 8 d) 5
- 9. x, y, z are integer that are side of an obtuse-angled triangle. If xy = 4, find z.
  a) 2
  b) 3
  c) 1
  d) More than one possible value of z
- 10. How many isosceles triangles with integer sides are<br/>possible such that sum of two of the side is 12?a) 11b) 6c) 17d) 23
- 11. Find maximum perimeter of an acute scalene  $\Delta$ . If one side is 12 units & rest sides are integer.
- 12. In the given figure BC is produced to D and  $\angle BAC = 40^{\circ}$  and  $\angle ABC = 70^{\circ}$ . Find the value of



- 13. If the angles of a triangle are in the ratio 1 : 4 : 7, then the value of the largest angle is:
  - a) 135° b) 84°
  - c) 105° d) none of these
- 14. In the adjoining figure  $\angle B = 70^{\circ}$  and  $\angle C = 30^{\circ}$ . BO and CO are the angle bisectors of  $\angle ABC$  and  $\angle ACB$ . Find the value of  $\angle BOC$



15. In the triangle ABC, side BC is produced to D. ∠ACD =  $100^{\circ}$  if BC = AC, then ∠ABC is:



16. In the given diagram, equilateral triangle EDC surmounts square ABCD. Find the m  $\angle$ BED represented by x. where m  $\angle$ EBC =  $\alpha^{\circ}$ 







- d)  $c^2 = a^2 + b^2 + 2ab$
- 26. In triangle ABC, angle B is a right angle. If (AC) is 6 cm, and D is the mid point of side AC. The length of BD is
  a) 4 cm
  b) 6cm
  c) 3 cm
  d) 3.5 cm
- 27. In a right angled triangle ΔDEF, if the length of the hypotenuse EF is 12 cm, then the length of the median DX is
  a) 3 cm
  b) 4 cm
  c) 6 cm
  d) 12 cm
- 28. In ΔABC,AB = 5 cm, AC = 7 cm. If AD is the angle bisector of ∠4 Then BD: CD is :
  a) 25 : 49
  b) 49 25
  c) 6 : 1
  d) 5 : 7
- 29. In a right angled  $\triangle ABC$ ,  $\angle C = 90^{\circ}$  and CD is the perpendicular on the hypotenuse AB, AB = c, BC = a, AC = b and CD = p, then :



30. In a right angled  $\triangle ABC$ ,  $\angle C = 90^{\circ}$  and CD is the perpendicular on hypotenuse AB if BC =15 cm and AC =20 cm then CD is



31. One side other than the hypotenuse of right angle isosceles triangle is 6 cm. The length of the perpendicular on the hypotenuse from the opposite vertex is :

a) 6 cm	b) 6√2 cm
c) 4 cm	d) 3√2 cm

- 32. Let ABC be an equilateral triangle. Let BE  $\perp$  CA meeting CA at E, then (AB<sup>2</sup> + BC<sup>2</sup> + CA<sup>2</sup>) is equal to: a) 2BE<sup>2</sup> b) 3BE<sup>2</sup> c) 4BE<sup>2</sup> d) 6BE<sup>2</sup>
- 33. In the figure AABE is an equilateral triangle in a square ABCD. Find the value of angle x in degrees :



34. In the ABC, BD bisects  $\angle B$ , and is perpendicular to AC. If the lengths of the sides of the triangle are expressed in terms of x and y as shown, find the value of x and y:



35. In the adjoining figure the angle BAC and  $\angle$ ADC are right angles. BA= 5 cm. AD = 3 cm and BD = 4 cm, what is the length of DC?





- 36. ABC is a right angled at A and AD is the altitude to BC. If AB= 7 cm and AC = 24 cm. Find the ratio of AD is to AM if M is the mid-point of BC :
  a) 25 : 41
  b) 32 : 41
  c) 336/625
  d) 625/336
- 37. Find the altitude to side AC of triangle with side AB = 20 cm, AC = 20 cm, BC = 30 cm. a)  $10\sqrt{7}$  b)  $8\sqrt{7}$ c)  $7.5\sqrt{7}$  d)  $15\sqrt{7}$
- 38. An acute-angled isosceles triangle has two of its sides equal to 10 and 16. Find the area of this triangle.
  a) √221 upits
  b) 121/66 upits

a) √231 units	b) 12766 units
c) 24 units	d) 5 √231 units

- 39. Sides of a triangle are 6, 10 and x for what value of x is the area of the △ the maximum?
  a) 8 cms
  b) 9 cms
  c) 12 cms
  d) None of these
- 40. Euclid has a triangle in mind. Its longest side has length 20 and another of its sides has length 10. Its area is 80. What is the exact length of its third side? a)  $\sqrt{260}$  b)  $\sqrt{250}$  c)  $\sqrt{240}$  d)  $\sqrt{270}$
- 41. In  $\triangle ABC$ , the internal bisector of  $\angle A$  meets BC at D. if AB = 4, AC = 3 and  $\angle A = 60^{\circ}$ , then the length of AD is
  - a)  $2\sqrt{3}$  b)  $\frac{12\sqrt{3}}{7}$  c)  $\frac{15\sqrt{3}}{8}$  d)  $\frac{6\sqrt{3}}{7}$
- 42. The two sides of a triangle are 8 cm and 9 cm and one angle is 60°. Which of the following can be the length of its third side?
  - I. √23 cm
  - II. √73 cm
  - III. (4.5 √3.25) cm
  - IV.  $(4 + \sqrt{33})$  cm
  - V. (9 + √13) cm
  - a) Only II and IV b) Only I, II and V
  - c) Only I and III d) Only II, III and IV
- 43. The three perpendicular distances of three sides of an equilateral triangle from a point which lies inside that triangle are 6 cm, 9 cm and 12 cm respectively. The perimeter of the triangle is

  a) 27√3 cm
  b) 36√3cm
  c) 54√3 cm
  d) None of these
- 44. The perimeters of two similar triangles ∆ABC and ∆PQR are 36 cm and 24 cm respectively. If PQ = 10 cm, then AB is a) 10 cm
  b) 15 cm
  c) 20 cm
  d) 25 cm
- 45. In  $\triangle$ ABC line PQ is drawn parallel to side BC where P and Q are respectively lie on side AB and AC. If AB = 3AP, what is the ratio of area of  $\triangle$ APQ to area of  $\triangle$ ABC? a) 1 : 3 b) 1 : 5 c) 1 : 7 d) 1 : 9

- 46. ABC is a triangle, PQ is line segment intersecting AB in P and AC in Q and PQ II BC. The ratio of AP : BP = 3 : 5 and length of PQ is 18 cm. The length of BC is
  - a) 28 cm b) 48 cm c) 84 cm d) 42 cm
- 47. Triangle ABC is similar to triangle PQR and AB : PQ = 2 : 3. AD is the median to the side BC in triangle ABC and PS is the median to the side QR in triangle PQR. What is the value of (BD/QS)<sup>2</sup>?

9 4 7

a) 
$$\frac{3}{5}$$
 b)  
c)  $\frac{2}{3}$  d)

- 48. In  $\Delta$ PQR, PQ = PR = 18 cm, AB and AC are parallel to lines PR and PQ respectively. If A is the midpoint of QR, then what is perimeter (in cm) of quadrilateral ABPC?
  - a) 18 b) 28 c) 32 d) 36
- 49. In a  $\triangle$ ABC, D is the mid-point of BC and E is midpoint of AD, BF passes through E. What is the ratio of AF : FC?



50. In the adjoining figure D, E and F are the mid-point of the sides BC, AC and AB respectively.  $\Delta DEF$  is congruent to triangle:



- 51. The triangle PQR is formed by joining the mid-point of the sides AB, BC and CA of  $\Delta$ ABC and the area of  $\Delta$ PQR is 6 cm<sup>2</sup>, then the area of  $\Delta$ ABC is:
  - a) 36 cm<sup>2</sup> b) 12 cm<sup>2</sup>
  - c) 18 cm<sup>2</sup> d) 24 cm<sup>2</sup>

- 52. The four triangles formed by joining the pairs of midpoints of the sides of a given triangle are congruent if the given triangle is :
  - a) an isosceles triangle
  - b) an equilateral triangle
  - c) a right angled triangle
  - d) of any shape
- 53. If D, E and F are respectively the midpoints of sides BC, CA and AB of a  $\triangle$ ABC. If EF = 3 cm, FD = 4 cm and AB =10 cm, then DE, BC and CA respectively will be equal to :
  - a) 6, 8 and 20 cm b) 4, 6 and 8 cm
  - c) 5, 6 and 8 cm d) 10/3, 9 and 12 cm
- 54. In the right angle triangle ∠C = 90°. AE and BD are two medians of a triangle ABC meeting at F. The ratio of the area of AABF and the quadrilateral FDCE is :

(a) 1 : 1	b) 1 : 2
c) 2 : 1	d) 2 : 3

- 55. ABC is a triangle and DE is drawn parallel to BC cutting the other sides at D and E. If AB = 3.6 cm, AC .2.4cm and AD = 2.1 cm, then AE is equal to :
  - a) 1.4 cm b) 1.8 cm
  - c) 1,2 cm d) 1.05 m
- 56. In the adjoining figure (not drawn to scale) AB,EF and CD are parallel lines. Given that EG= 5 cm, GC = 10 cm and DC = 18 cm. Calculate AC, if AB =15 cm :



57. In the adjoining figure PA, QB and RC are each perpendicular to AC. Which one of the following is true :



58. If PQ||RS, find the value of x



59. In the diagram given below,  $\angle ABD = \angle CDB = \angle PQD$ = 90°. If AB:CD = 3:1, the ratio of CD:PQ is



60. In the figure (not drawn to scale) given below, P is a point on AB such that AP : PB = 4 : 3. PQ is parallel to AC and QD is parallel to CP. In ∠ARC, ∠ARC = 90°, and in ∠PQS, ∠PSQ = 90°. The length of QS is 6 cms. What is ratio AP : PD?



61. Consider the triangle ABC shown in the following figure where BC = 12 cm, DB = 9 cm, CD = 6 cm and  $\angle$ BCD =  $\angle$ BAC. What is the ratio of the perimeter of the triangle ADC to that of the triangle BDC?



62. If sides of a triangle are respectively 5 cm, 6 cm and 7 cm then radius of the circumcircle of the triangle is

a) 9 cm b) 
$$\frac{35}{\sqrt{6}}$$
 cm c)  $\frac{35}{4\sqrt{6}}$  cm d)  $\frac{17}{2}$  cm



63. What is the distance between the orthocentre and the circumcenter of a triangle who sides measure 24 cm, 26 cm and 10 cm?

a) 13 cm	b) 12 cm
c)7.5 cm	d) √30 cm

- 64. An equilateral triangle of side 6 cm is inscribed in a circle. Then radius of the circle is a) 2√3 cm b) 3√2 cm c) 4√3 cm d) √3 cm
- 65. ABC is a right angled triangle.  $\angle BAC = 90^3$  and  $\angle ACB = 60^{\circ}$ . What is the ratio of the circumradius of the triangle to the side AB? a) 1:2 b) 1:√3 c) 2:√3 d) 2:3
- 66. If centre of incircle of triangle ABC is O and  $\angle$ BOC=110°, then what is the value of  $\angle$ BAC? a) 20° b) 40° c) 55° d) 110°
- 67. In a triangle ABC,  $\angle A = 70^\circ$ ,  $\angle B = 80^\circ$  and D is the incentre of  $\triangle ABC$ .  $\angle ACB = 2x^{\circ}$  and  $\angle BDC = y^{\circ}$ . The values of x and y, respectively are a) 15, 130 b) 15, 125 d) 30, 15 c) 35, 40
- 68. If O is the orthocentre of a triangle ABC and  $\angle BOC$ = 100°, the measure of  $\angle BAC$  is a) 100° b) 180° c) 80° d) 200°
- 69. Triangle ABC has angles  $A = 60^{\circ}$  and  $B = 70^{\circ}$ . The incenter of this triangle is at I. Find angle BIC. a) 90° b) 130° c) 80° d) 120°
- 70. In a triangle ABC,  $\angle A = 70^\circ$ ,  $\angle B = 80^\circ$  and D is the incentre of  $\triangle ABC$ .  $\angle ACB = 2x^{\circ}$  and  $\angle BDC = y^{\circ}$ . The values of x and y, respectively are a) 15, 130 b) 15, 125 c) 35, 40 d) none
- 71. In a triangle ABC if  $A = 90^\circ$ , b = 3 and c = 4 then R : r is a) 5 : 3 b) 7:3 c) 3:2 d) 5:2
- 72. In an equilateral triangle, the incentre, circumcentre orthocentre and centroid are: a) concylic b) coincident

c) collinear	d) none of these

- 73. A triangle PQR is formed by joining the mid-points of the sides of a triangle ABC. 'O' is the circumcentre of  $\triangle ABC$  then for  $\triangle PQR$ , the point 'O' is: b) circumcentre
  - a) incentre
  - c) orthocentre d) centroid
- 74. In a  $\triangle$ ABC, AB = 10 cm, BC = 12 cm and AC = 14 cm. Find the length of median AD. If G is the centroid, find length of GA:

a) $\frac{5}{3}\sqrt{7}, \frac{5}{9}\sqrt{7}$	b) $5\sqrt{7}$ , $4\sqrt{7}$
c) $\frac{10}{3}$ , $\frac{8}{3}\sqrt{7}$	d) $4\sqrt{7}, \frac{8}{3}\sqrt{7}$

75. In triangle XYZ, G is the centroid. If XY = 11 cm, YZ = 14 cm. and XZ = 7 cm, then what is the value (in cm) of GM?



76. The length of a side of an equilateral triangle is 8 cm. The area of the region lying between the circum circle and the incircle of the triangle is (use:  $\pi = \frac{22}{1}$ 

a) 
$$50\frac{1}{7}$$
 cm<sup>2</sup>  
b)  $50\frac{2}{7}$  cm<sup>2</sup>  
c)  $75\frac{1}{7}$  cm<sup>2</sup>  
d)  $75\frac{2}{7}$  cm<sup>2</sup>

77. If distance between orthocentre and circumcentre of a triangle is 6 cm then what is the distance between its centroid and circumcentre?

78. Consider a right-angled triangle with inradius 2 cm and circumradius of 7 cm. What is the area of the triangle? b) 31.5 sqcms

d) 33 sqcms

a) 32 sqcms c) 32.5 sqcms

## Mixed Triangle

- 79. ΔABC is an isosceles right angled triangle having  $\angle C = 90^{\circ}$ . If D is any point on AB, then AD<sup>2</sup> + BD<sup>2</sup> is equal to a) CD<sup>2</sup> b) 2CD<sup>2</sup>
  - c) 3CD<sup>2</sup> d) 4CD<sup>2</sup>
- 80. Triangle has perimeter of 6 +  $2\sqrt{3}$ . One of the angles in the triangle is equal to the exterior angle of a regular hexagon another angle is equal to the exterior angle of a regular 12-sided polygon. Find area of the triangle. 3

a) 2√3	b) √:
c) √3/2	d) 3

81. There is an equilateral triangle with a square inscribed inside it. One of the sides of the square lies on a side of the equilateral  $\triangle$ . What is the ratio of the area of the square to that of the equilateral triangle?

a) 12 : 12 + 7√3	b) 18 : 12 + 15√3
c) 24 : 24 + 7√3	d) 6 : 6 + 5√3



P Q R If PQ/PR=PR/RQ, then a)  $\frac{PR}{QR} > 2$  b)  $\frac{PR}{QR} < 2$ c)  $\frac{PR}{QR} = 2$  d) CBD

83. A right angled triangle PQR is such that ∠PRQ = 90° and QR = 4 cm T is a point on QR such that PT = 3 cm, and perimeter of triangle PQT = Perimeter of triangle PTR Then, QT/TR takes the value.

a) 
$$\frac{QT}{TR} < \frac{1}{3}$$
 b)  $\frac{QT}{TR} > 1$   
c)  $\frac{1}{3} < \frac{QT}{TR} < 1$  d) CBD

84. In the figure given bellow,  $\triangle ABC$  is right angled and AC = 100 cm. Also, AD = DE = EF = FC. Find the value of:BD<sup>2</sup> + BE<sup>2</sup> + BF<sup>2</sup> (in cm<sup>2</sup>)



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1. B	2. B	3. C	4. 17	5. 22	6. a) Four	7. C	8. A	9. B	10. A
					b) Ten				
					c) One				
11.84	12. D	13. C	14. D	15. B	16. D	17. C	18. B	19. C	20. D
21. A	22. D	23. C	24. B	25. A	26. C	27. C	28. D	29. D	30. B
31. D	32. C	33. C	34. C	35. C	36. C	37. C	38. D	39. D	40. A
41. B	42. D	43. C	44. B	45. D	46. B	47. B	48. D	49. B	50. D
51. D	52. D	53. C	54. A	55. A	56. B	57. C	58. C	59. B	60. C
61. A	62. C	63. A	64. C	65. B	66. B	67. B	68. C	69. D	70. B
71. D	72. B	73. C	74. D	75. C	76. B	77. B	78. A	79. B	80. A
81. A	82. A	83. C	84. C						