Problem Set

1. How many degrees are there in an angle which is equal to one-fourth of its supplement?

2. In a right-angled triangle ABC, find the length of the altitude BD drawn from B to the hypotenuse AC, given AB = 9 cm and BC = 12 cm.

3. Triangles ABC and DEF are similar. If $\angle A = \angle D, \angle C = \angle F$, BC = 3.4 cm, DE = 4.8 cm and AB = 1.6 cm, then find the length of EF.

4. A and B leave a point at the same time. A travels North at 18 km/hr and B travels West at a speed of 24 km/hr. Find the distance between A and B after two hours.

5. What is the number of distinct triangles with integral valued sides and perimeter as 14?

6. A ladder of length 65 m is resting against a wall. If it slips 8 m down the wall, then its bottom will move away from the wall by N m. If it was initially 25 m away from it, what is the value of N ?

7. $\triangle ABC$ is a right-angled triangle BD $\perp$ AC. If AD = 8 cm and DC = 2 cm, then BD = ?

8. A man starting at a point walks one km east, then two km north, then one km east, then one km north, then one km east and then one km north to arrive at the destination. What is the shortest distance from the starting point to the destination?
   (a) $2\sqrt{2}$ km
   (b) 7 km
   (c) $3\sqrt{2}$ km
   (d) 5 km

9. Which one of the following cannot 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

10. The length of a ladder is exactly equal to the height of the wall it is leaning against. If lower end of the ladder is kept on a stool of height 3 m and the stool is kept 9 m away from the wall, the upper end of the ladder coincides with the top of the wall. Then the height of the wall is
    (a) 12 m
    (b) 15 m
    (c) 18 m
    (d) 11 m

11. In $\triangle ABC$, points P, Q and R are the mid-points of sides AB, BC and CA respectively. If area of $\triangle ABC$ is 20 sq. units, find the area of $\triangle PQR$.
    (a) 10 sq. units
    (b) $5\sqrt{3}$ sq. units
    (c) 5 sq. units
    (d) None of these

12. A certain city has a circular wall around it, and this wall has four gates pointing north, south, east and west. A house stands outside the city, 3 km north of the north gate, and it can just be seen from a point 9 km east of the south gate. What is the diameter of the wall that surrounds the city?
    (a) 6 km
    (b) 9 km
    (c) 12 km
    (d) None of these

13. A ladder leans against a vertical wall. The top of the ladder is 8 m above the ground. When the bottom of the ladder is moved 2 m farther away from the wall, the top of the ladder rests against the foot of the wall. What is the length of the ladder?
    (a) 10 m
    (b) 15 m
    (c) 20 m
    (d) 17 m

14. 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) $\sqrt{270}$

15. In the triangle ABC, AB = 6, BC = 8 and AC = 10. A perpendicular dropped from B, meets the side AC at D. A circle of radius BD (with center B) is drawn. If the circle cuts AB and BC at P and Q respectively, the AP:QC is equal to
(a) 1 : 1
(b) 3 : 2
(c) 4 : 1
(d) 3 : 8

16. Given an equilateral triangle T1 with side 24 cm, a second triangle T2 is formed by joining the midpoints of the sides of T1. Then a third triangle T3 is formed by joining the midpoints of the sides of T2. If this process of forming triangles is continued, the sum of the areas, in sq cm, of infinitely many such triangles T1, T2, T3,... will be
(a) $248\sqrt{3}$
(b) $192\sqrt{3}$
(c) $188\sqrt{3}$
(d) $164\sqrt{3}$

Answers:

1. 36°, 2. 7.2 cm, 3. 10.2 cm, 4. 60 km, 5. 4, 6. 14 m, 7. 4 cm, 8. d, 9. c, 10. b, 11. c, 12. b, 13. d, 14. a, 15. d, 16. b