

# CBSE Assignment 30-1-1

January 4, 2024

1. Find the coordinates of a point **A**, where **AB** is diameter of a circle whose center is  $(2, -3)$  and **B** is the point  $(1, 4)$ .
2. For what values of  $k$ , the roots of the equation  $x^2 + 4x + k = 0$  are real?
3. Find the value of  $k$  for which the roots of the equation  $3x^2 - 10x + k = 0$  are reciprocal of each other.
4. Find  $A$  if

$$\tan 2A = \cot(A - 24^\circ)$$

5. Find the value of

$$(\sin^2 33^\circ + \sin^2 57^\circ)$$

6. How many two digits numbers are divisible by 3 ?
7. In Figure 1,  $DE \parallel BC$ ,  $AD = 1\text{cm}$ ,  $BD = 2\text{cm}$ . What is the ratio of the ar  $(\triangle ABC)$  to the ar  $(\triangle ADE)$ ?

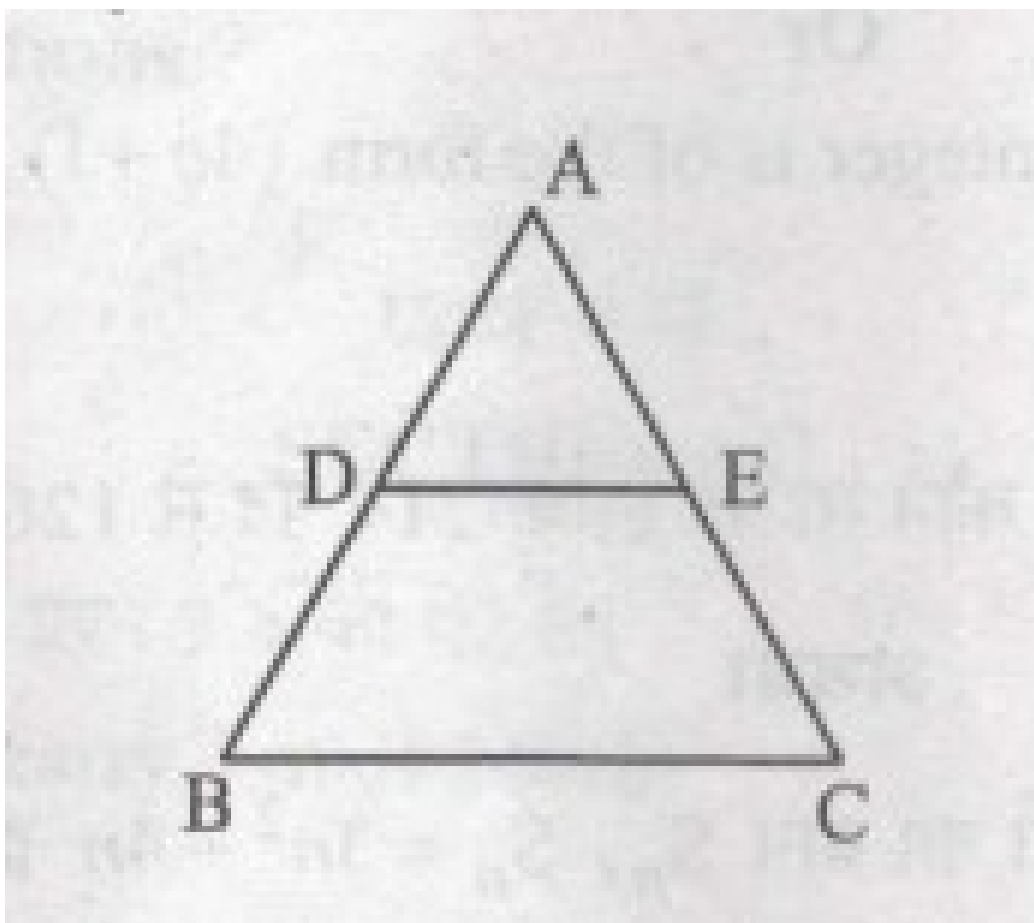


Figure 1

8. Find a rational number between  $\sqrt{2}$  and  $\sqrt{3}$ .
9. Find the HCF of 1260 and 7344 using Euclid's algorithm.
10. Show that every positive odd integer is of the form  $(4q + 1)$  or  $(4q + 3)$ , where  $q$  is some integer.
11. Which term of the AP 3, 15, 27, 39, .... will be 120 more than its 21st term?
12. If  $S_n$ , the sum of first  $n$  terms of an AP is given by  $S_n = 3n^2 - 4n$ , find the  $n$ th term.

13. Find the ratio in which the segment joining the points  $(1, 3)$  and  $(4, 5)$  is divided by  $x$  -  $axis$ ? Also find the coordinates of this point on  $x$  -  $axis$ .
14. A game consists of tossing a coin 3 times and noting the outcome each time. If getting the same result in all the tosses is a success, find the probability of losing the game.
15. A die is thrown once. Find the probability of getting a number which i is a prime number ii lies between 2 and 6.
16. Find  $e$  if the system of equations  $cx + 3y + (3 - c) = 0$ ;  $12x + cy - c = 0$  has infinitely many solutions?
17. Prove that  $\sqrt{2}$  is an irrational number.
18. Find the value of  $k$  such that the polynomial  $x^2 - (k + 6)x + 2(2k - 1)$  has sum of its zeros equal to half of their product.
19. A father's age is three times the sum of the ages of his two children. After 5 years his age will be two times the sum of their ages. Find the present age of the father.
20. A fraction becomes  $\frac{1}{3}$  when 2 is subtracted from the numerator and it becomes  $\frac{1}{2}$  when 1 is subtracted from the denominator. Find the fraction.
21. Find the point on  $y$  -  $axis$  which is equidistant from the points  $(5, -2)$  and  $(-3, 2)$ .
22. The line segment joining the points **A**  $(2, 1)$  and **B**  $(5, -8)$  is trisected at the points **P** and **Q** such that **P** is nearer to **A**. If **P** also lies on the line given by  $2x - y + k = 0$ , find the value of **k**.
23. Prove that

$$(\sin \theta + \csc \theta)^2 + (\cos \theta + \sec \theta)^2 = 7 + \tan^2 \theta + \cot^2 \theta$$

24. Prove that

$$(1 + \cot A - \csc A)(1 + \tan A + \sec A) = 2$$

25. In Figure 2,  $PQ$  is a chord of length  $8\text{cm}$  of a circle of radius  $5\text{cm}$  and centre  $O$ . The tangents at  $P$  and  $Q$  intersect at point  $T$ . Find the length of  $TP$ .

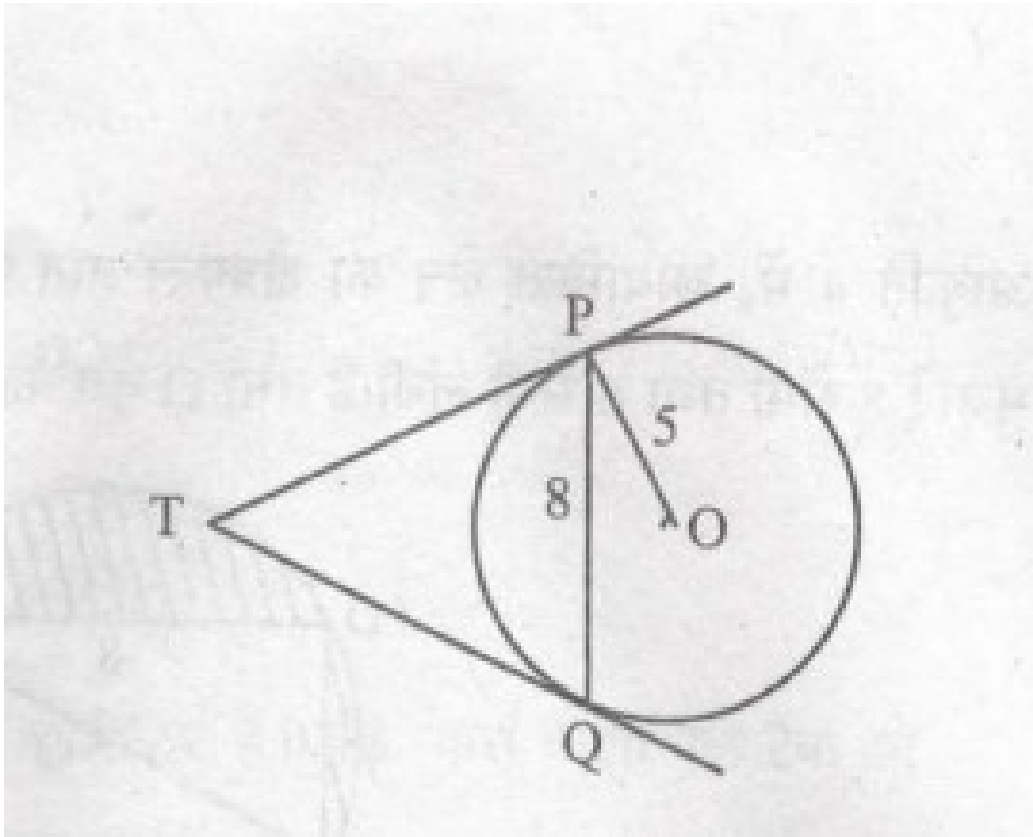


Figure 2

26. In Figure 3, angle  $ACB = 90^\circ$  and  $CD \perp AB$ , prove that  $CD^2 = BD \times AD$ .

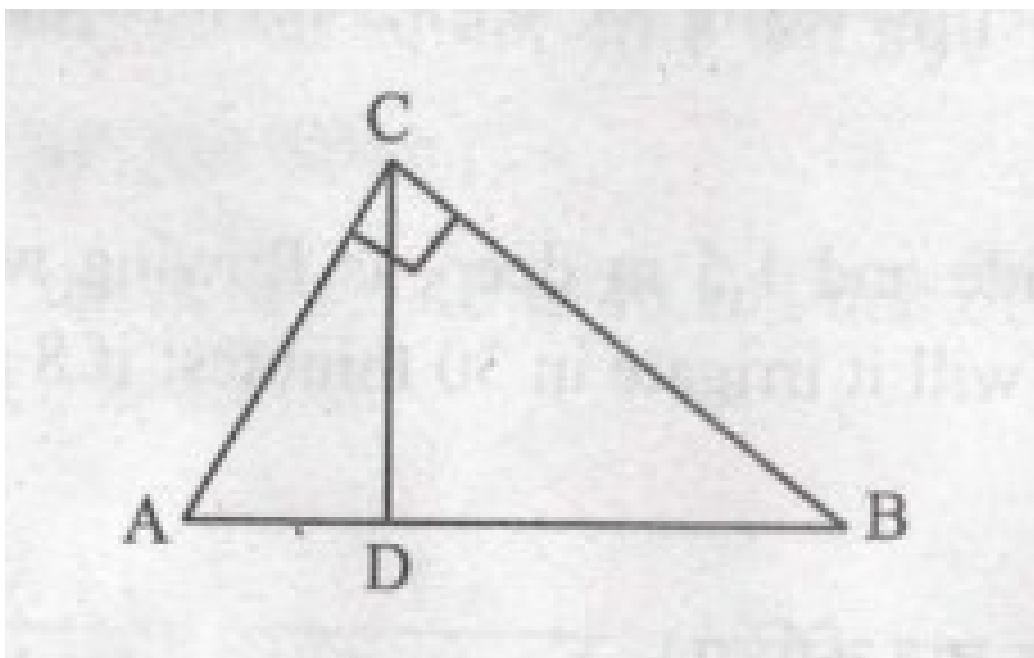


Figure 3

27. If  $P$  and  $Q$  are the points on side  $CA$  and  $CB$  respectively of  $ABC$ , right angled at  $C$ , prove that  $(AQ^2 + BP^2) = (AB^2 + PQ^2)$
28. Find the area of the shaded region in Figure 4, if  $ABCD$  is a rectangle with sides  $8\text{cm}$  and  $6\text{cm}$  and  $O$  is the centre of circle. ( $\pi = 3.14$ )

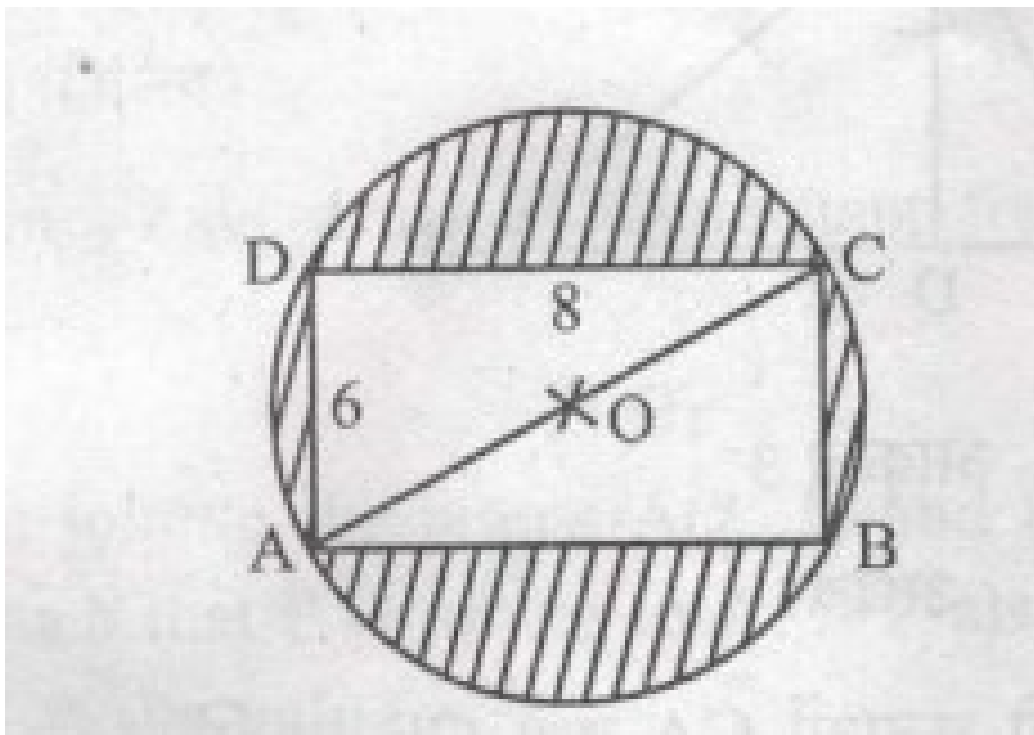


Figure 4

29. Water in a canal,  $6m$  wide and  $1.5m$  deep, is flowing with a speed of  $10 \text{ km/hr}$ . How much area will it irrigate in  $30 \text{ minutes}$ ; if  $8 \text{ cm}$  standing water is needed?
30. Two water taps together can fill a tank in  $1\frac{7}{8}$  hours. The tap with longer diameter takes 2 hours less than the tap with smaller one to fill the tank separately. Find the time in which each tap can fill the tank separately.
31. A boat goes  $30 \text{ km}$  upstream and  $44 \text{ km}$  downstream in 10 hours. In 13 hours, it can go  $40 \text{ km}$  upstream and  $55 \text{ km}$  downstream. Determine the speed of the stream and that of the boat in still water.
32. If the sum of first four terms of an  $AP$  is 40 and that of first 14 terms is 280. Find the sum of its first  $n$  terms.
33. Prove that

$$\frac{\sin A - \cos A + 1}{\sin A + \cos A - 1} = \frac{1}{\sec A - \tan A}$$

34. A man in a boat rowing away from a light house  $100m$  high takes 2 minutes to change the angle of elevation of the top of the light house from  $60^\circ$  to  $30^\circ$ . Find the speed of the boat in metres per minute. [Use  $\sqrt{3} = 1.732$ ]
35. two poles of equal heights are standing opposite each other on either side of the road, which is  $80m$  wide. From a point between them on the road, the angles of elevation of the top of the poles are  $60^\circ$  to  $30^\circ$  respectively. Find the height of the poles and the distances of the point from the poles.
36. Construct a  $\triangle ABC$  in which  $CA = 6cm$ ,  $AB = 5cm$  and  $BAC = 45^\circ$ . Then 3 construct a triangle whose sides are of the corresponding sides of  $\triangle ABC$ .
37. A bucket open at the top is in the form of a frustum of a cone with a capacity of  $12308.8cm^3$ . The radii of the top and bottom of circular ends of the bucket are  $20cm$  and  $12cm$  respectively. Find the height of the bucket and also the area of the metal sheet used in making it. (Use  $\pi = 3.14$ )
38. Prove that in a right angle triangle, the square of the hypotenuse is equal the sum of squares of the other two sides.