

**Mathematics**

Board Exam 2023

Practice Test Paper No. 1

Class 10<sup>th</sup>

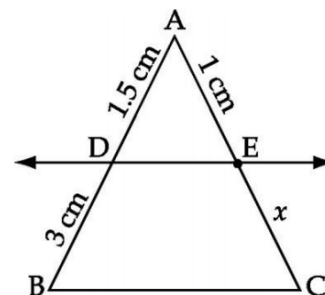
Time: 3 h

Marks: 80

Section	A	B	C	D	E
Q. No.	1 – 20	21 – 25	26 – 31	32 – 35	36 – 38
Marks	1	2	3	5	4
Type	MCQ	S. A. Type 1	S. A. Type 2	L. A. Type	Case Study Based

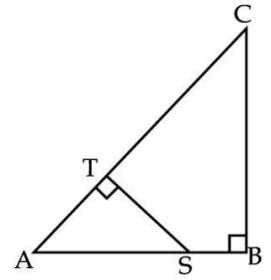
**Section A**

- The [HCF × LCM] for the numbers 50 and 20 is:  
(a) 10                      (b) 100                      (c) 1000                      (d) 50
- Roots of the quadratic equation  $2x^2 - x + \frac{1}{8} = 0$  are:  
(a)  $\frac{1}{4}, \frac{1}{4}$                       (b)  $\frac{1}{2}, \frac{1}{2}$                       (c)  $\frac{1}{8}, \frac{1}{8}$                       (d) 2, 2
- If one of the zeroes of the quadratic polynomial  $(k - 1)x^2 + kx + 1$  is  $(-3)$ , then  $k$  equals to:  
(a)  $\frac{4}{3}$                       (b)  $-\frac{4}{3}$                       (c)  $\frac{2}{3}$                       (d)  $-\frac{2}{3}$
- The pair of linear equations  $2x - 3y = 1$  and  $3x - 2y = 4$  have:  
(a) One solution                      (b) Two solutions                      (c) No solution                      (d) Many solutions
- If  $A(2, 3)$ ,  $B(-2, 1)$  and  $C(x, y)$  are vertices of  $\triangle ABC$  and  $G\left(1, \frac{2}{3}\right)$  is its centroid, then the coordinates of vertex  $C$  are:  
(a)  $(0, -2)$                       (b)  $(3, 2)$                       (c)  $(3, -2)$                       (d)  $(2, 0)$
- In figure,  $DE \parallel BC$  then  $x$  equals to:  
(a) 2.5 cm                      (b) 2 cm                      (c) 1.4 cm                      (d) 4 cm

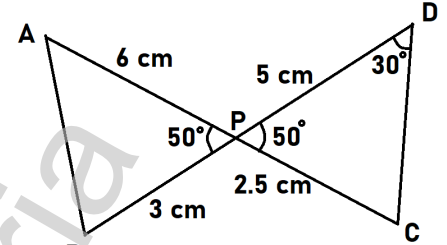


- The value of  $\cos 60^\circ \cos 30^\circ + \sin 60^\circ \sin 30^\circ$  is :  
(a)  $\frac{1}{4}$                       (b)  $\frac{3}{4}$                       (c)  $\frac{\sqrt{3}}{2}$                       (d)  $\frac{2}{4}$
- If  $\sin \theta = \cos \theta$ , then value of  $\theta$  is:  
(a)  $0^\circ$                       (b)  $45^\circ$                       (c)  $30^\circ$                       (d)  $90^\circ$
- If the perimeter of a semicircular protractor is 36 cm, then its diameter is :  
(a) 10 cm                      (b) 12 cm                      (c) 14 cm                      (d) 15 cm

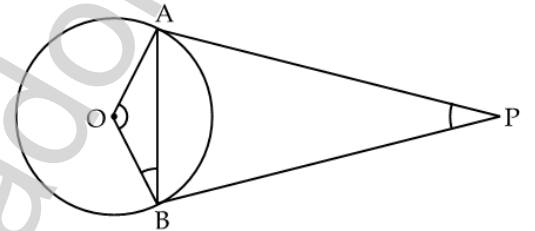
10. In the given figure,  $\angle T$  and  $\angle B$  are right angles. If the lengths of AT, BC and AS (in centimeters) are 15, 16 and 17 respectively, then the length of TC (in centimeters) is
- (a) 18                      (b) 16                      (c) 19                      (d) 12



11. In the given figure, two line segments AC and BD intersect each other at the point P such that PA = 6 cm, PB = 3 cm, PC = 2.5 cm, PD = 5 cm,  $\angle APB = 50^\circ$  and  $\angle CDP = 30^\circ$ . Then  $\angle PBA$  is:
- (a)  $50^\circ$                       (b)  $30^\circ$                       (c)  $60^\circ$                       (d)  $100^\circ$

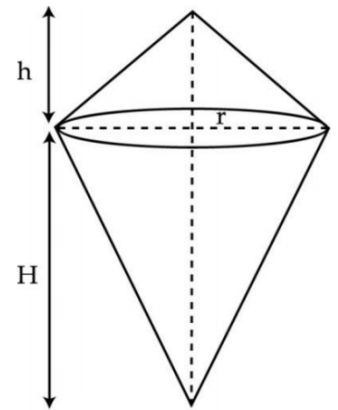


12. Two tangents are drawn from an external point P (as shown in fig.) such that  $\angle OBA = 10^\circ$ . Here  $\angle BPA$  is:
- (a)  $10^\circ$                       (b)  $20^\circ$                       (c)  $30^\circ$                       (d)  $40^\circ$



13. A solid metallic object is shaped like a double cone as shown in Figure. Radius of base of both cones is same but their heights are different. If this cone is immersed in water, the quantity of water it will displace is equal to:

- (a)  $\frac{1}{3}\pi r^2 hH$                       (b)  $\frac{1}{3}\pi r^2 (h+H)$   
 (c)  $\frac{1}{3}\pi r^2 (H-h)$                       (d)  $\pi r^2 \left(H + \frac{h}{3}\right)$



14. If the mean and median of a distribution are 270 and 220 respectively, then the mode of the data is:
- (a) 120                      (b) 220                      (c) 280                      (d) 370
15. If a wire is bent into the shape of a square, then the area enclosed by the square is  $81 \text{ cm}^2$ . When the same wire is bent into a semi-circular shape, then the area enclosed by the semicircle will be:
- (a)  $22 \text{ cm}^2$                       (b)  $44 \text{ cm}^2$                       (c)  $77 \text{ cm}^2$                       (d)  $154 \text{ cm}^2$
16. The mean of 6 numbers is 16 with the removal of a number the mean of remaining numbers is 17. The number removed is:
- (a) 2                      (b) 22                      (c) 11                      (d) 6
17. What is the probability that a leap year, selected at random will have 53 Sundays?
- (a)  $\frac{1}{7}$                       (b)  $\frac{2}{7}$                       (c)  $\frac{3}{7}$                       (d)  $\frac{4}{7}$
18. The value of  $\tan 1^\circ \cdot \tan 2^\circ \cdot \tan 3^\circ \dots \dots \dots \tan 89^\circ$  is:
- (a) 0                      (b) 1                      (c) 2                      (d)  $\frac{1}{2}$

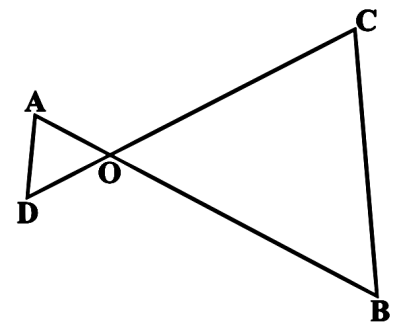
**DIRECTION:** In the question number 19 and 20, a statement of **assertion (A)** is followed by a statement of **Reason (R)**. Choose the correct option.

- (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).  
 (b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A).  
 (c) Assertion (A) is true but reason (R) is false.  
 (d) Assertion (A) is false but reason (R) is true.

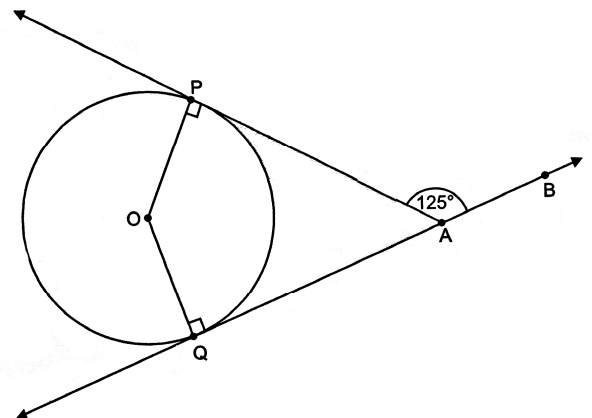
19. **Assertion (A):**  $9x + 12y - 7 = 0$  and  $6x + 8y - 14 = 0$  form a consistent pair of linear equations.  
**Reason (R):** A pair of linear equations,  $px + qy + r = 0$  and  $fx + gy + h = 0$ , has no solution if  $\frac{p}{f} = \frac{q}{g} \neq \frac{r}{h}$ .
20. **Assertion (A):** 2 is a rational number.  
**Reason (R):** The square roots of all positive integers are irrationals.

### Section B

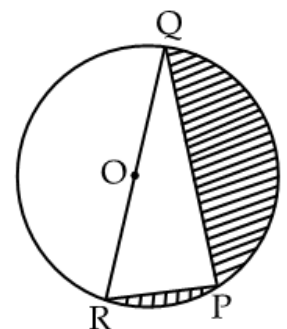
21. Find the value(s) of  $k$  for which the pair of linear equations  $kx + y = k^2$  and  $x + ky = 1$  have infinitely many solutions.
22. In Fig. given,  $OA.OB = OC.OD$ . Show that  $\angle A = \angle C$  and  $\angle B = \angle D$ .



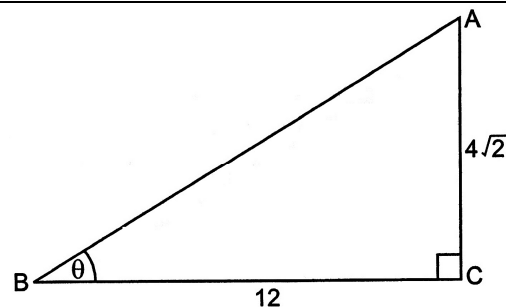
23. In figure, O is the centre of the circle. AP and AQ are two tangents drawn to the circle. B is a point on the tangent QA produced and  $\angle PAB = 125^\circ$ . Find  $\angle POQ$ .



24. In the given figure, find the area of the shaded region, if  $PQ = 24$  cm,  $PR = 7$  cm and O is the centre of the circle.



25. In the given figure,  $\triangle ABC$  is right angled at C,  $BC = 12$  units,  $AC = 4\sqrt{2}$  units and  $\angle ABC = \theta$ . Determine the values of:
- $\cos^2 \theta + \sin^2 \theta$ ,
  - $\sin \theta \cdot \cos \theta$

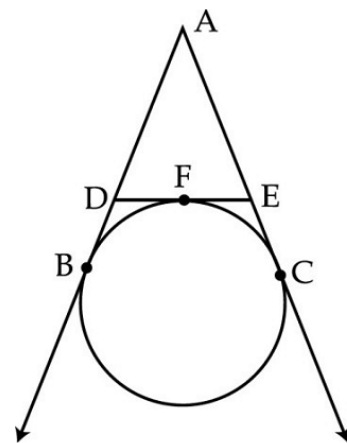


### Section C

26. Show that  $6^n$  cannot end with the digit zero for any natural number  $n$ .
27. If  $\alpha, \beta$  are the zeroes of the polynomial  $6y^2 - 7y + 2$ , find a quadratic polynomial whose zeroes are  $\frac{1}{\alpha}$  and  $\frac{1}{\beta}$ .
28. Two years ago, Sachin was thrice as old as his daughter and six years later, he will be four years older than twice her age. How old are they now?
29. Prove that:  $\frac{\cos A}{1 + \sin A} + \frac{1 + \sin A}{\cos A} = 2 \sec A$ .

30. In the given figure, AB and AC are two tangents to a circle from an external point A. DE is a line segment touching the circle at F and intersecting AB at D and AC at E. Prove that:

$$AB = \frac{1}{2} (\text{Perimeter of } \triangle ADE).$$



31. Cards marked with numbers 10 to 109 are placed in a box and mixed thoroughly. One card is drawn at random from the box. Find the probability of getting:
- a number greater than 90
  - a number which is a prime less than 40
  - a number which is a perfect square.

### Section D

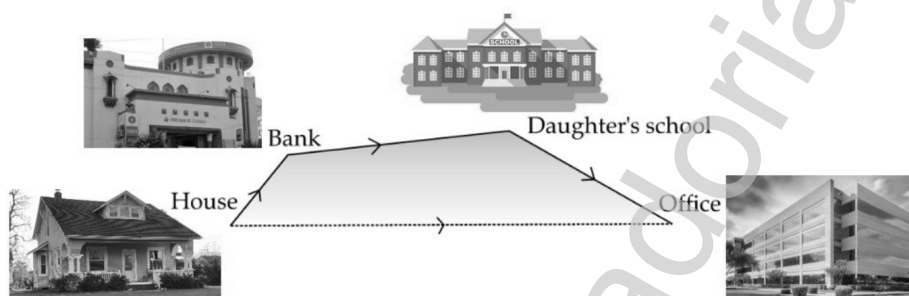
32. A train travelling at a uniform speed for 360 km would have taken 48 minutes less to travel the same distance if its speed were 5 km/hour more. Find the original speed of the train.
33. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, prove that the other two sides are divided in the same ratio.
34. An iron pillar has some part in the form of a right circular cylinder and the remaining in the form of a right circular cone. The radius of the base of each of the cone and the cylinder is 8 cm. The cylindrical part is 240 cm high and conical part is 36 cm high. Find the weight of the pillar if 1 cu. cm of iron weighs 7.5 grams.
35. The following frequency distribution shows the distance (in metres) thrown by 68 students in a Javelin throw competition.

Distance (in m)	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
No. of students	4	5	13	20	14	8	4

Find the median distance thrown in the competition.

### Section E

36. Aditya Starts walking from his house to office. Instead of going to the office directly, he goes to a bank first, from there to his daughter's school and then reaches the office. (Assume that all distances covered are in straight lines). If the house is situated at (2, 4), bank at (5, 8), school at (13, 14) and office at (13, 26) and coordinates are in km.



- (a) What is the distance between house and bank? (1 mark)  
 (b) What is the distance between Daughter's School and bank? (1 mark)  
 (c) What is the total distance travelled by Aditya to reach the office? (2 marks)
37. India is competitive manufacturing location due to the low cost of manpower and strong technical and engineering capabilities contributing to higher quality production runs. The production of TV sets in a factory increases uniformly by a fixed number every year. It produced 16000 sets in 6<sup>th</sup> year and 22600 in 9<sup>th</sup> year.



Based on the above information, answer the following questions:

- (a) Find the production during first year. (1 mark)  
 (b) Find the production during first 3 years. (1 mark)  
 (c) In which year, the production is 29,200 units? (2 marks)
38. A group of students of class X visited India Gate on an education trip. The teacher and students had interest in history as well. The teacher narrated that **India Gate**, official name **Delhi Memorial**, originally called **All-India War Memorial**, monumental sandstone arch in New Delhi, dedicated to the troops of British India who died in wars fought between 1914 and



1919. The teacher also said that India Gate, which is located at the eastern end of the Rajpath (formerly called the Kingsway), is about 138 feet (42 metres) in height.



- (a) What is the angle of elevation if they are standing at a distance of 42 m away from the monument? (1 mark)
- (b) They want to see the tower at an angle of  $60^\circ$ . So, they want to know the distance where they should stand and hence find the distance. (1 mark)
- (c) If the altitude of the Sun is at  $60^\circ$ , then the height of a vertical tower that will cast a shadow of length 20 m? (2 marks)



### Words of Wisdom

The journey of a thousand miles begins with one step.

- Lao Tzu

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