MATHEMATICS	BOARD PRACTICE TEST

CLASS - X (STANDARD)

**TIME : 3 HRS.**   **MAX. MARKS : 80**

GENERAL INSTRUCTIONS :

⁌ **All questions are compulsory.**

⁌ **The question paper consists of 38 questions divided into five sections A, B, C, D and E.**

⁌ **Section A contains multiple choice questions (Q.1 to Q.18) and Assertion-Reason based questions (Q.19 & Q.20) of one mark each, only the correct option is to be written in your answer sheet.**

   Section B contains short answer type questions (Q.21 to Q.25) carrying two marks each.

   Section C contains short answer type questions (Q.26 to Q.31) carrying three marks each.

   Section D contains long answer type questions (Q.32 to Q.35) carrying five marks each.

   Section E has 3 case based integrated units of assessment 4 marks each with sub-parts of the values of 1, 1 and 2 marks each respectively.

⁌ **All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks sub-part of each question of Section E**

⁌ **There is no overall choice. However, internal choice may be provided. You have to attempt only one of the alternatives in all such questions.**

⁌ **Use of calculators and cell-phones are not permitted in the Examination Hall.**

SECTION-A

1. Three bells ring at intervals of 48, 60 and 72 mins. If they start ringing together after how much time will they next ring together?

   (1) 540 mins   (2) 1440 mins   (3) 320 mins   (4) 720 mins

2. If α, β are the zeroes of the quadratic polynomial $p(x) = x^2 - 4\sqrt{3}x + 3$, then the value of $\alpha + \beta - \alpha\beta$ is

   (1) $4\sqrt{3}$ (2) -3 (3) $4\sqrt{3} - 3$ (4) $-4\sqrt{3} - 3$

3. Given below is the graph representing two linear equations by lines AB and CD respectively. What is the area of the triangle formed by these two lines and the line x = 0?
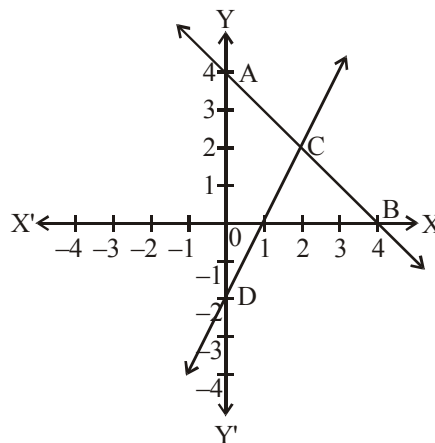

   (1) 3 sq. units   (2) 4 sq. units   (3) 6 sq. units   (4) 8 sq. units

4. For what value of k, $kx^2 + 8x + 2 = 0$ has real roots?

(1) $k \le 8$ (2) $k > 8$ (3) $k \ge 8$ (4) None of these

5. The sum of first five positive integers divisible by 6 is

(1) 180 (2) 90 (3) 45 (4) 30

6. The point which divides the line segment joining the points (7, –6) and (3, 4) in ratio 1 : 2 internally lies in the

(1) I quadrant (2) II quadrant (3) III quadrant (4) IV quadrant

7. In which ratio the y-axis divides the line segment joining the points (5, –6) and (–1, –4)?

(1) 1 : 5 (2) 5 : 1 (3) 1 : 1 (4) 1 : 2

8. In $\triangle ABC \sim \triangle DEF$, such that $\angle A = 47°$ and $\angle E = 83°$, then the value of $\angle C$ is
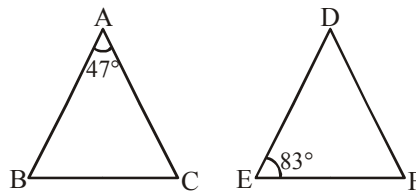
(1) 50° (2) 60° (3) 45° (4) 90°

9. From a point P which is at a distance of 13 cm from the centre O of a circle of radius 5 cm, the pair of tangents PQ and PR to the circle are drawn. Then the area of the quadrilateral PQOR is

(1) 60 cm² (2) 65 cm² (3) 30 cm² (4) 32.5 cm²

10. In the given figure, if PA and PB are tangents to the circle with centre O such that $\angle APB = 50°$, then $\angle OAB$ is equal to :
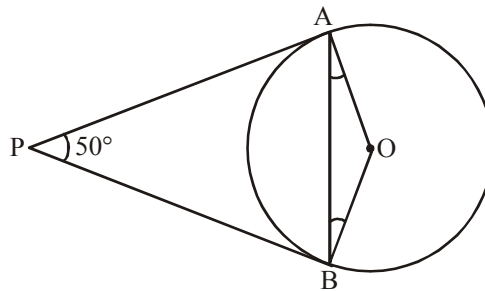
(1) 25° (2) 30° (3) 40° (4) 50°

11. If $\sin A + \sin^2 A = 1$, then the value of the expression $(\cos^2 A + \cos^4 A)$ is

(1) 1 (2) $\dfrac{1}{2}$ (3) 2 (4) 3

12. Given that $\cos^2\theta - \sin^2\theta = \dfrac{3}{4}$ then $\cos\theta =$

(1) $\dfrac{\sqrt{3}}{2}$ (2) $\dfrac{1}{2}$ (3) $\dfrac{\sqrt{7}}{2}$ (4) $\dfrac{\sqrt{7}}{\sqrt{8}}$

13. The angle of depression of a bike parked on the road from the top of a 90 m high pole is 60 degrees. The distance of the bike from the pole is

(1) $20\sqrt{3}$ m   (2) 90 m   (3) $15\sqrt{3}$ m   (4) $30\sqrt{3}$ m

14. The area of the circle that can be inscribed in a square of 6 cm is

(1) 36π cm^2 (2) 18π cm^2 (3) 12π cm^2 (4) 9π cm^2

15. The minute hand of a clock is 84 cm long. The distance covered by the tip of minute hand from 10 : 10 am to 10 : 25 am is

(1) 44 cm   (2) 88 cm   (3) 132 cm   (4) 176 cm

16. Which of the following cannot be the probability of an event?

(1) 0.01   (2) 3%   (3) $\dfrac{16}{17}$ (4) $\dfrac{17}{16}$

17. 2 cards of hearts and 4 cards of spades are missing from a pack of 52 cards. What is the probability of getting a black card from the remaining pack?

(1) $\dfrac{22}{52}$ (2) $\dfrac{22}{46}$ (3) $\dfrac{24}{52}$ (4) $\dfrac{24}{46}$

18. If the mean of the following distribution is 2.6, then the value of y is

Variable (x)	1	2	3	4	5
Frequency	4	5	y	1	2

(1) 3   (2) 8   (3) 13   (4) 24

19. **Assertion (A) :** The base radii of two right circular cylinders of the same height are in the ratio 3 : 5. The ratio of their curved surface area is 3 : 5.

Reason (R) : CSA of right circular cylinder is $2\pi r^2 h$.

(1) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(2) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).

(3) Assertion (A) is true but Reason (R) is false.

(4) Assertion (A) is false but Reason (R) is true.

20. **Assertion (A) :** Common difference of an A.P. in which $a_{21} - a_7 = 84$ is 14.

Reason (R) : n^{th} term of AP is given by $a_n = a + (n - 1)d$.

(1) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(2) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).

(3) Assertion (A) is true but Reason (R) is false.

(4) Assertion (A) is false but Reason (R) is true.

SECTION-B

21. The dimensions of a room are 8 m 25 cm, 6 m 75 cm and 4 m 50 cm. Find the length of the largest measuring rod which can measure the dimensions of room exactly.

22. Two right triangles ABC and DBC are drawn on the same hypotenuse BC and on the same side of BC. If AC and BD intersect at P, prove that AP × PC = BP × DP.

23. If tangents PA and PB from a point P to a circle with centre O are drawn so that ∠APB = 80°, then find ∠POA?
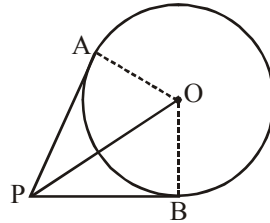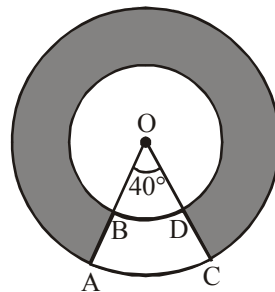

24. In a right angle triangle ABC, right angled at B, if $\sin (A - C) = \dfrac{1}{2}$ find the measures of angles A and C.

OR

If $\sin\theta = \dfrac{2mn}{m^2 + n^2}$, find the value of $\dfrac{\sin\theta \cot\theta}{\cos\theta}$.

25. In figure, find the area of the shaded region, enclosed between two concentric circles of radii 7 cm and 14 cm, where ∠AOC = 40°. $\left(\text{Use } \pi = \dfrac{22}{7} \right)$

OR

The perimeter of a sector of a circle of radius 5.2 cm is 16.4 cm. Find the area of the sector.

## SECTION-C

26. Prove that $\sqrt{5}$ is an irrational number.

27. If α and β are the zeroes of the polynomial f(x) = 6x² + x − 2, find the value of $\dfrac{\alpha}{\beta} + \dfrac{\beta}{\alpha}$.

28. Solve for x and y : 71x + 37y = 253 and 37x + 71y = 287.

OR

The taxi charges in a city consists of a fixed charge together with the charge for the distance covered. For a distance of 6 km, the charges paid are Rs.58 while for a journey of 10 km, the charges paid are Rs.90. Find the charge per km and the fixed charge.

29. Shown below is a circle and 2 congruent squares (PQRS and QTUR). ST, SU and UT are tangents to the circle. The side length of the square is 10 cm. Find the radius of the circle. Figure, is not to scale.
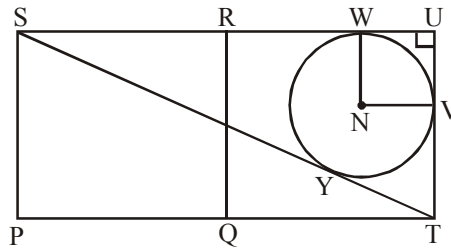
OR

In the figure below, M and N are the centres of two semi-circles having radii 9 cm and 16 cm
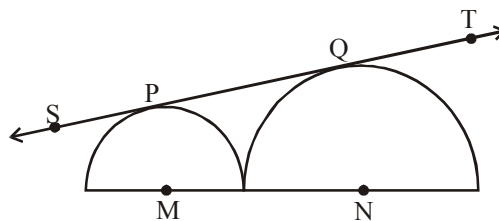
Find the length of PQ.

30. Prove that : $\dfrac{\sin A - 2\sin^3 A}{2\cos^3 A - \cos A} = \tan A$

31. Find the values of frequency 'x' and 'y' in the following frequency distribution table, if N = 100 and median is 32.

Marks	0-10	10-20	20-30	30-40	40-50	50-60
Number of students	10	x	25	30	y	10

SECTION-D

32. A train covers a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, it would have taken 3 hours more to cover the same distance. Find the original speed of the train.

OR

To fill a swimming pool two pipes are used. If the pipe of larger diameter used for 4 hours and the pipe of smaller diameter for 9 hours, only half of the pool can be filled. Find, how long it would take for each pipe to fill the pool separately, if the pipe of smaller diameter takes 10 hours more than the pipe of larger diameter to fill the pool?

33. Prove that if a line is drawn parallel to one side of a triangle intersecting the other two sides in distinct points, then the other two sides are divides in the same ratio.

Using the above theorem prove that a line through the point of intersection of the diagonals and parallel to the base of the trapezium divides the non parallel sides in the same ratio.

34. Due to heavy floods in a state, thousands were rendered homeless 50 schools collectively decided to provide place and the canvas for 1500 tents and share the whole expenditure equally. The lower part of each tent is cylindrical with base radius 2.8 m and height 3.5 m and the upper part is conical with the same base radius, but of height 2.1 m. If the canvas used to make the tents costs Rs.120 per m², find the amount shared by each school to set up the tents.

OR

In figure, a decorative block is shown which is made of two solids, a cube and a hemisphere. The base of the block is a cube with edge 6 cm and the hemisphere fixed on the top has a diameter of 4.2 cm. Find :
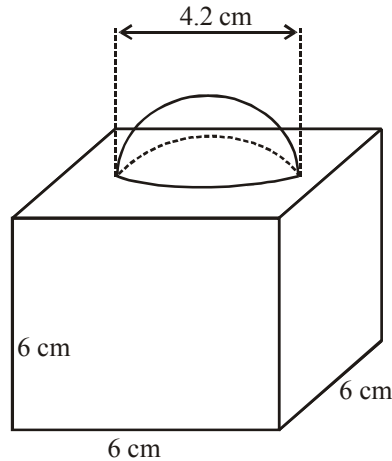
(i) the total surface area of the block.

(ii) the volume of the block formed $\left(\text{Take } \pi = \dfrac{22}{7} \right)$.

35. The mean of the following frequency distribution is 62.8 and the sum of all the frequencies is 50. Compute the missing frequency f_1 and f_2.

Classes	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	5	f_1	10	f_2	7	8

SECTION-E

36. Case Study-1

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 6th year and 22600 in 9th year.

(i) Find the production during first year. **(1)**

(ii) Find the production during 8th year. **(1)**

(iii) Find the production during first 3 years. **(2)**

OR

In which year, the production is Rs.29,200. **(2)**

37. **Case Study-2**

In a GPS, the lines that run east-west are known as lines of latitude, and the lines running north-south are known as lines of longitude. The latitude and the longitude of a place are its coordinates and the distance formula is used to find the distance between two places. A family from Uttar Pradesh planned a round trip from Lucknow (L) to Puri (P) via Bhuj (B) and Nashik (N) as shown in the given figure below.
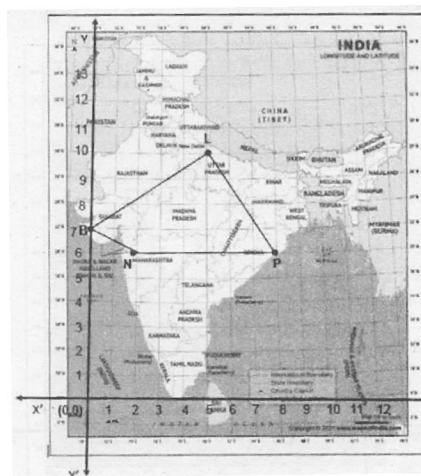
Based on the information answer the following questions using the coordinate geometry.

(i) Find the distance between Lucknow (L) to Bhuj (B). **(1)**

(ii) If Kota (K), internally divide the line segment joining Lucknow (L) to Bhuj (B) into 3 : 2 then find the coordinate of Kota (K). **(1)**

(iii) Name the type of triangle formed by the places Lucknow (L), Nashik (N) and Puri (P). **(2)**

OR

Find a place (point) on the longitude (y-axis) which is equidistant from the points Lucknow (L) and Puri (P). **(2)**

38. **Case Study-3**

Authority wants to construct a slide in a city park for children. The slide was to be constructed for children below the age of 12 years. Authority prefers the top of the slide at a height of 4 m above the ground and inclinded at an angle of 30° to the ground.
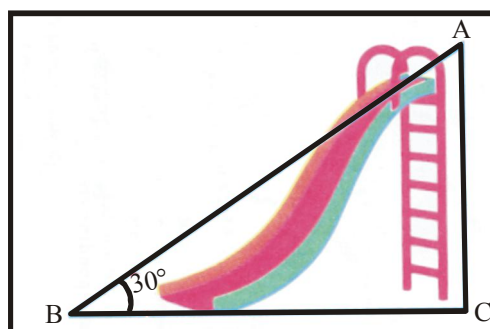
(i) If $\cos A = \dfrac{1}{2}$, then find the value of $12 \cot^2 A - 2$. **(1)**

(ii) In the given figure, find the value of $(\sin C \times \cos A)$. **(1)**

(iii) What is the length of BC and AB. **(2)**

OR

If angle of inclination changes from 30° to 60°. What will be length of BC and AB. **(2)**