Mathematics (Standard) – Code 041

CBSE Class 10 Board Examination 2027 – Practice Paper No. 2

Practice Question Paper

Time: 3 hours **Max. Marks: 80**

(i) This question paper contains 38 questions. All questions are compulsory.
(ii) This question paper is divided into five sections – A, B, C, D and E.
(iii) In Section A, Question numbers 1 to 18 are multiple choice questions (MCQs) and Question numbers 19 and 20 are Assertion–Reason based questions of 1 mark each.
(iv) In Section B, Question numbers 21 to 25 are very short answer (VSA) type questions, carrying 2 marks each.
(v) In Section C, Question numbers 26 to 31 are short answer (SA) type questions, carrying 3 marks each.
(vi) In Section D, Question numbers 32 to 35 are long answer (LA) type questions, carrying 5 marks each.
(vii) In Section E, Question numbers 36 to 38 are case study based questions, carrying 4 marks each.
(viii) There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C and 2 questions in Section D. An internal choice has been provided in all the 2-mark sub-parts of the questions in Section E.
(ix) Draw neat and clean figures wherever required. Take $\pi = 22/7$ wherever required, if not stated.
(x) Use of calculators is not allowed.

SECTION A This section comprises 18 multiple choice questions (Q.1 to Q.18) and 2 Assertion–Reason based questions (Q.19 and Q.20) of 1 mark each. **[20]**

1. If $396 = 2^x \times 3^y \times 11^z$, where x, y and z are natural numbers, then $x + y + z$ is:
(A) 4 (B) 5
(C) 6 (D) 3

2. If one zero of the quadratic polynomial $3x^2 - 11x + k$ is 3, then its other zero is:
(A) 2/3 (B) −2/3
(C) 3/2 (D) 2

3. The lines represented by $4x - 6y = 10$ and $6x + ky = 15$ are coincident. The value of k is:
(A) 9 (B) 4
(C) −9 (D) −4

4. Which of the following quadratic equations has two distinct real roots?
(A) $x^2 + x + 1 = 0$ (B) $4x^2 - 12x + 9 = 0$
(C) $2x^2 - 5x + 4 = 0$ (D) $3x^2 + 2x - 2 = 0$

5. The sum of the first n terms of an A.P. is given by $S_n = 3n^2 + 2n$. The 10th term of the A.P. is:
(A) 56 (B) 59
(C) 62 (D) 320

6. If $\triangle ABC \sim \triangle QRP$, $\angle A = 50°$ and $\angle B = 60°$, then $\angle P$ is:
(A) 50° (B) 60°
(C) 70° (D) 80°

7. If the distance between the points P(k, 3) and Q(4, −1) is 5 units, then the value(s) of k is/are:
(A) 1 or 7 (B) −1 or 7
(C) 1 or −7 (D) −1 or −7

8. If $40 \tan\theta = 9$, where θ is an acute angle, then the value of $(1 - \sin\theta)/\cos\theta$ is:

(A) 5/4 (B) 32/41

(C) 9/40 (D) 4/5

9. A number x is chosen at random from the numbers 1, 2, 3, ..., 25. The probability that $x^2 < 60$ is:

(A) 6/25 (B) 7/25

(C) 8/25 (D) 1/5

10. A paper hand-fan opens out into a sector of a circle of radius 10.5 cm with a central angle of 120°. The area of the paper in the open fan is:

(A) 115.5 cm^2 (B) 231 cm^2

(C) 346.5 cm^2 (D) 57.75 cm^2

11. A toy is made by fixing a cone of base radius 3 cm and height 4 cm on a hemisphere of the same radius, with their circular faces together. The total surface area of the toy is:

(A) 24π cm^2 (B) 27π cm^2

(C) 33π cm^2 (D) 42π cm^2

12. The mean of the following frequency distribution is 18. The value of p is:

Class	0–10	10–20	20–30	30–40
Frequency	4	p	6	2

(A) 6 (B) 10

(C) 12 (D) 8

13. A spinner has 8 equal sectors numbered 1 to 8. It is spun once. The probability that the pointer stops at a number which is a factor of 8 is:

(A) 1/4 (B) 3/8

(C) 5/8 (D) 1/2

14. If the point (2, p) is the mid-point of the line segment joining A(−1, 5) and B(q, −3), then p + q is:

(A) 6 (B) 4

(C) 5 (D) 3

15. Two tangents PA and PB drawn from an external point P to a circle with centre O and radius 4 cm are perpendicular to each other. The length OP is:

(A) 4 cm (B) $4\sqrt{2}$ cm

(C) 8 cm (D) $2\sqrt{2}$ cm

16. For a grouped frequency distribution with N = 60, the median class is 40–50, its frequency is 16 and the cumulative frequency of the class preceding it is 18. The median of the distribution is:

(A) 45 (B) 50

(C) 52.5 (D) 47.5

17. From the top of a water tank 18 m high, the angle of depression of a point on the level ground is 60°. The distance of the point from the foot of the tank is:

(A) 6 m (B) $18\sqrt{3}$ m

(C) $6\sqrt{3}$ m (D) 9 m

18. The perimeter of a sector of a circle of radius 7 cm with central angle 90° is:

(A) 25 cm (B) 11 cm

(C) 18 cm (D) 32 cm

19. **Assertion–Reason based questions.** Directions: In Question numbers 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Select the correct answer from the options (A), (B), (C) and (D) given below each question.
Assertion (A): In △ABC, D and E are points on the sides AB and AC respectively such that DE ∥ BC. If AD = 2 cm and DB = 3 cm, then DE : BC = 2 : 3.
Reason (R): If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

(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 but 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.

20. **Assertion (A):** −150 is a term of the A.P. 12, 9, 6, 3, ...
Reason (R): Every negative integer is a term of the A.P. 12, 9, 6, 3, ...

(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 but 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.

SECTION B This section comprises 5 very short answer (VSA) type questions of 2 marks each. **[10]**

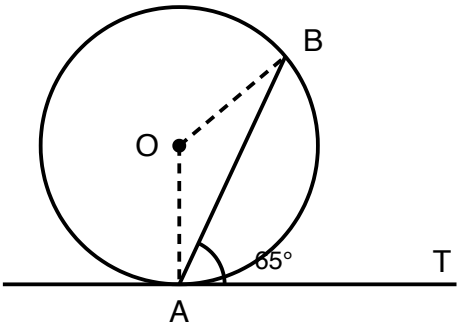
21. Three electronic display boards at a railway station in Pune refresh their screens every 42 seconds, 56 seconds and 63 seconds respectively. If all three refresh together at 6:00:00 a.m., at what time will they next refresh together? Use prime factorisation.

22. (A) In △ABC, D and E are points on the sides AB and AC respectively such that ∠ADE = ∠ABC. If AD = 4 cm, AB = 10 cm and BC = 7.5 cm, find DE.
OR
(B) In △PQR, L and M are points on the sides PQ and PR respectively such that PL = 2.4 cm, LQ = 4.8 cm, PM = 1.8 cm and MR = 3.6 cm. Is LM ∥ QR? Justify your answer. If ∠PLM = 72°, find ∠PQR.

23. If $2\cos^2\theta - 3\cos\theta + 1 = 0$, where $0° < \theta < 90°$, find θ. Hence find the value of $\sin^2\theta + \tan^2\theta$.

24. (A) A lawn sprinkler in a garden in Nashik waters a region in the shape of a sector of a circle of radius 42 m, turning through an angle of 30°. Find the area of the region watered and the length of its curved edge.
OR
(B) A flower bed in a park is in the shape of a sector of a circle of radius 21 m. A fence of total length 97 m runs exactly once along its whole boundary (the two radii and the arc). Find the angle of the sector and the area of the flower bed.

25. In the given figure, AB is a chord of a circle with centre O and AT is the tangent to the circle at A. If ∠BAT = 65°, find ∠OAB and ∠AOB.



SECTION C This section comprises 6 short answer (SA) type questions of 3 marks each. **[18]**

26. Given that $\sqrt{5}$ is an irrational number, prove that $1/(\sqrt{5} - 2)$ is an irrational number.

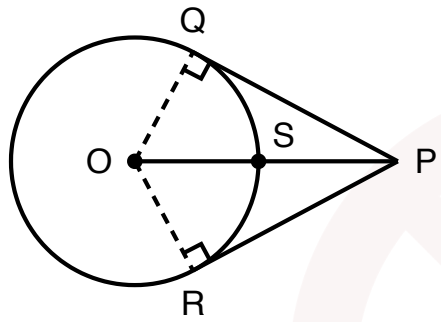
27. If α and β are the zeroes of the quadratic polynomial $p(x) = 2x^2 - 11x + k$ such that $\alpha - \beta = 3/2$, find the value of k and the zeroes of p(x).

28. (A) A gym in Aurangabad charges a one-time admission fee and a fixed fee for every month. Riya paid ₹4,600 in all for 6 months and Kunal paid ₹7,000 in all for 10 months. Find the admission fee and the monthly fee. How much will a person pay in all for 12 months?

OR

(B) The first term of an A.P. is 21 and the sum of its first 15 terms is zero. Find the common difference, the 10th term and the sum of the first 10 terms of the A.P.

29. In the given figure, PQ and PR are tangents drawn from an external point P to a circle with centre O, touching it at Q and R. The line segment OP meets the circle at S. If PQ = 15 cm and PS = 9 cm, find (i) the radius of the circle, (ii) the area of the quadrilateral OQPR, and (iii) the length of the chord QR.



30. (A) Prove that $(1 + \cos\theta - \sin^2\theta) / [\sin\theta (1 + \cos\theta)] = \cot\theta$, where $0° < \theta < 90°$.

OR

(B) If $\sec\theta + \tan\theta = 5/2$, where θ is an acute angle, find the value of $\sec\theta - \tan\theta$. Hence find $\sin\theta$ and $\cos\theta$.

31. The distance travelled in a day by 50 food-delivery riders in Nashik is given below. Find the modal distance travelled.

Distance (km)	0–10	10–20	20–30	30–40	40–50	50–60
Number of riders	2	7	16	10	8	7

SECTION D This section comprises 4 long answer (LA) type questions of 5 marks each. **[20]**

32. (A) The gram panchayat of a village near Solapur owns a corner plot in the shape of a right-angled triangle ABC, right-angled at B. The side BC is 23 m longer than the side AB, and the side AC is 2 m longer than the side BC. Form a quadratic equation and find the lengths of the three sides of the plot. Also find the cost of fencing the plot all around at ₹125 per metre.

OR

(B) Meera's grandmother is 52 years older than Meera. Six years from now, the product of their ages (in years) will be 1088. Form a quadratic equation and find their present ages. Also find how many years ago the grandmother's age was 14 times Meera's age.

33. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.
Using the above result, solve the following: In $\triangle ABC$, D and E are points on the sides AB and AC respectively such that DE $\parallel$ BC. If AD = (x + 1) cm, DB = (3x − 1) cm, AE = (x + 3) cm and EC = (3x + 4) cm, find the value of x and the lengths of AB and AC.

34. (A) A concrete planter for a tulsi plant (tulsi vrindavan) is made from a solid cuboid of length 35 cm, breadth 35 cm and height 20 cm. A cylindrical cavity of radius 14 cm and depth 15 cm is hollowed out from the middle of its top face to hold soil. Find (i) the volume of concrete in the planter, and (ii) the total surface area of the planter, including the inside of the cavity.

OR

(B) A wooden model of a temple is made of a solid cube of edge 14 cm surmounted by a solid cone. The base of the cone is the largest circle that can be drawn on the top face of the cube, and the height of the cone is 24 cm. Find (i) the total surface area of the model, and (ii) its volume.

35. Ramesh lives in an apartment building in Nagpur. From a point at the foot of his building, the angle of elevation of the top of a mobile tower standing on the same level ground is 60°. From the terrace of the building, 24 m above the ground, the angle of elevation of the top of the tower is 30°. Draw a neat figure and find (i) the distance between the building and the tower, (ii) the height of the tower, and (iii) the length of a cable stretched straight from the terrace to the top of the tower. (Use $\sqrt{3} = 1.73$)

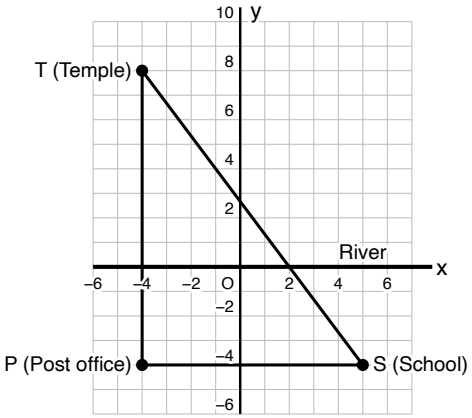
SECTION E This section comprises 3 case study based questions of 4 marks each. Each case study has three sub-parts (i), (ii) and (iii) of 1, 1 and 2 marks respectively. **[12]**

36. To promote healthy eating, the eco-club of a school in Sangli is setting up a rectangular kitchen garden of area 300 m^2. The length of the garden is 5 m more than its breadth. Let the breadth of the garden be x m.
Based on the above information, answer the following questions:
(i) Form a quadratic equation in x representing the area of the garden. (1 mark)
(ii) Find the discriminant of the equation formed in (i) and state the nature of its roots. (1 mark)
(iii) (A) Find the length and the breadth of the garden. (2 marks)

OR

(iii) (B) The students plant 270 vegetable saplings in the garden in rows such that the number of rows is 3 less than the number of saplings in each row. Find the number of saplings in each row and the number of rows. (2 marks)

37. The map of a village near Wardha is drawn on a coordinate plane, with 1 unit = 100 m. A straight river flows along the x-axis. The temple is at T(−4, 8), the school is at S(5, −4) and the post office is at P(−4, −4). A straight road joins the temple and the school, and straight roads join the temple to the post office and the post office to the school (see figure).



Based on the above information, answer the following questions:

(i) Find the distance between the temple and the school. (1 mark)

(ii) Amit goes from the temple to the post office and then to the school along the straight roads TP and PS. How many metres more does he travel than he would along the straight road TS? (1 mark)

(iii) (A) The road TS crosses the river at a bridge B. Find the ratio in which B divides TS, and the coordinates of B. (2 marks)

OR

(iii) (B) A water tank W is to be built on the road TS such that TW : WS = 1 : 2. Find the coordinates of W. (2 marks)

38. At the Maths Mela of a school in Pune, a game stall has a box of 40 identical cards: 20 red cards numbered 1 to 20 and 20 green cards numbered 1 to 20. A player draws one card at random from the well-shuffled box.

Based on the above information, answer the following questions:

(i) Find the probability that the card drawn is a red card bearing an even number. (1 mark)

(ii) Find the probability that the card drawn bears the number 15. (1 mark)

(iii) (A) Find the probability that the card drawn is (a) a green card bearing a prime number, (b) a card bearing a multiple of 6. (2 marks)

OR

(iii) (B) All the red cards bearing numbers less than 6 are removed from the box. A card is now drawn at random from the remaining cards. Find the probability that it is (a) a red card, (b) a card bearing the number 4. (2 marks)

All the best for your exam!