jeeinfo
Your JEE Guide

MP Board Class X · Mathematics (Standard)

Sample Question Paper 2 · Session 2026-27

Time allowed: 3 hours **Maximum marks: 75**

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission.
This is an original practice paper written to the MPBSE 2027 sample question paper pattern; it is not issued by MPBSE.

General instructions:

1. All questions are compulsory.
2. Sub-questions of question numbers 1 to 5 carry 1 mark each.
3. Question numbers 6 to 17 carry 2 marks each.
4. Question numbers 18 to 20 carry 3 marks each.
5. Question numbers 21 to 23 carry 4 marks each.
6. Internal choices are provided for question numbers 18 to 23.
7. Draw neat and clean labelled diagrams wherever required.

1.	**(i)** *Choose and write the correct option:* The LCM of 12 and 18 is: (a) 36 (b) 6 (c) 72 (d) 216	1
	(ii) If 2 is a zero of $x^2 + kx - 6$, then k is: (a) 3 (b) 1 (c) 2 (d) –1	1
	(iii) The lines x = 3 and y = 2 intersect at the point: (a) (2, 3) (b) (3, 0) (c) (0, 0) (d) (3, 2)	1
	(iv) The equation $x^2 + x + 1 = 0$ has: (a) only one root (b) two distinct real roots (c) no real roots (d) two equal real roots	1
	(v) If △ABC ~ △DEF and AB/DE = 2/3, the ratio of their perimeters is: (a) 2 : 3 (b) 3 : 2 (c) 4 : 9 (d) 8 : 27	1
	(vi) The value of tan 60° × cot 60° is: (a) 3 (b) 1 (c) $\frac{1}{\sqrt{3}}$ (d) $\sqrt{3}$	1

2.	**(i)** *Fill in the blanks:* The decimal expansion of a rational number is either terminating or non-terminating _____.	1
	(ii) The graph of a quadratic polynomial is a curve called a _____.	1
	(iii) The nth term of an AP with first term a and common difference d is _____.	1
	(iv) Every point on the x-axis has its y-coordinate equal to _____.	1
	(v) A line that meets a circle in two distinct points is called a _____.	1
	(vi) cos 0° = _____.	1
3.	**(i)** *Write True or False:* The product of two irrational numbers is always irrational.	1
	(ii) The equation $x^2 + 2x + 1 = 0$ has two equal roots.	1
	(iii) 1, 1, 1, 1, … is an arithmetic progression.	1
	(iv) Two similar triangles are always congruent.	1
	(v) As we walk towards a tower, the angle of elevation of its top increases.	1
	(vi) The probability of an event can be negative.	1
4.	Match column A with column B: Column A: (i) sin 30° — (ii) cos 30° — (iii) tan 30° — (iv) sin 90° — (v) cos 90° — (vi) tan 60° Column B: (a) 1 — (b) $\frac{1}{2}$ — (c) 0 — (d) $\frac{1}{\sqrt{3}}$ — (e) $\sqrt{3}$ — (f) $\frac{\sqrt{3}}{2}$	6
5.	**(i)** *Write the answer in one word or one sentence:* Write the HCF of any two consecutive natural numbers.	1
	(ii) Write the product of the zeroes of $2x^2 - 8x + 6$.	1
	(iii) Write the sum of the first 10 natural numbers.	1
	(iv) Write the point where the line x + y = 4 meets the y-axis.	1
	(v) Write the circumference of a circle of radius 7 cm. (Use π = 22/7.)	1
	(vi) A coin is tossed once. Write the probability of getting a head.	1

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official MPBSE paper.

6.	Find the HCF and LCM of 84 and 120 by prime factorisation.	2
7.	Find the zeroes of $x^2 + 7x + 10$.	2
8.	For what value of k does the pair kx + 3y = 5, 2x + 6y = 7 have no solution?	2
9.	Find k so that $kx^2 + 4x + 1 = 0$ has two equal roots.	2
10.	Find the sum of the first 20 terms of the AP 1, 4, 7, …	2
11.	A 6 m tall pole casts a shadow 4 m long. At the same time a tower casts a shadow 28 m long. Find the height of the tower.	2
12.	Find x if the distance between (x, 2) and (3, –2) is 5.	2
13.	Evaluate $2\tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ$.	2
14.	A kite string 60 m long makes an angle of 60° with the level ground. Find the height of the kite, assuming the string is straight.	2
15.	The length of the tangent from a point Q to a circle is 8 cm, and Q is 10 cm from the centre. Find the radius.	2
16.	Find the area of a quadrant of a circle whose circumference is 44 cm. (Use π = 22/7.)	2
17.	Find the probability that a non-leap year has 53 Sundays.	2
18.	Solve by elimination: 3x – y = 7 and 2x + 3y = 1. **OR** Three bells ring at intervals of 9, 12 and 15 minutes. If they ring together at 8 a.m., when will they next ring together?	3
19.	In what ratio does the x-axis divide the segment joining (2, –3) and (5, 6)? Find the point of division. **OR** Find the perimeter of the triangle with vertices O(0, 0), A(6, 0) and B(0, 8). Is it a right triangle?	3
20.	Find the median of the following data: Class: 0–10 | 10–20 | 20–30 | 30–40 | 40–50 Frequency: 3 | 7 | 12 | 10 | 8 **OR** Two dice are thrown together. Find the probability that (a) the sum is 8; (b) the product is 6; (c) a doublet appears.	3

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official MPBSE paper.

<table>
<tr><td>21.</td><td>Two positive numbers differ by 3 and their product is 504. Find the numbers.
OR
The 4th term of an AP is 14 and its 9th term is 34. Find the AP and the sum of its first 15 terms.</td><td>4</td></tr>
<tr><td>22.</td><td>Prove that $\frac{\cos A}{1-\sin A} + \frac{\cos A}{1+\sin A} = 2\sec A$.
OR
A tree breaks in a storm, and the broken part bends so that its top touches the ground 12 m from the foot of the tree, making an angle of 30° with the ground. Find the original height of the tree.</td><td>4</td></tr>
<tr><td>23.</td><td>A solid is a cylinder with a hemisphere at each end. Its total length is 20 cm and its diameter is 7 cm. Find its volume. (Use π = 22/7.)
OR
Find the mean of the following data:<table><tr><td>Class</td><td>0–20</td><td>20–40</td><td>40–60</td><td>60–80</td><td>80–100</td></tr><tr><td>Frequency</td><td>6</td><td>10</td><td>12</td><td>8</td><td>4</td></tr></table></td><td>4</td></tr>
</table>

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official MPBSE paper.

Answers and Marking Scheme

Marks for each step are shown in brackets. Any correct alternative method gets full credit.

Question 1

(i) **(a)** 36. *Working:* $12 = 2^2 \times 3$, $18 = 2 \times 3^2$; LCM $= 2^2 \times 3^2$.

(ii) **(b)** 1. *Working:* $4 + 2k - 6 = 0$.

(iii) **(d)** (3, 2). *Working:* $x = 3$ and $y = 2$ at the same point.

(iv) **(c)** no real roots. *Working:* $D = 1 - 4 = -3 < 0$.

(v) **(a)** 2 : 3. *Working:* Perimeters are in the ratio of corresponding sides.

(vi) **(b)** 1. *Working:* $\cot\theta = 1/\tan\theta$.

Question 2

(i) recurring (repeating).

(ii) parabola.

(iii) $a + (n - 1)d$.

(iv) 0.

(v) secant.

(vi) 1.

Question 3

(i) False: $\sqrt{2} \times \sqrt{2} = 2$.

(ii) True: $D = 0$.

(iii) True: its common difference is 0.

(iv) False: they have the same shape but may differ in size.

(v) True.

(vi) False: $0 \le P(E) \le 1$.

4. (i) – (b) $\frac{1}{2}$; (ii) – (f) $\frac{\sqrt{3}}{2}$; (iii) – (d) $\frac{1}{\sqrt{3}}$; (iv) – (a) 1; (v) – (c) 0; (vi) – (e) $\sqrt{3}$

Question 5

(i) 1.

(ii) $c/a = 3$.

(iii) 55.

(iv) (0, 4).

(v) 44 cm.

(vi) 1/2.

6. $84 = 2^2 \times 3 \times 7$, $120 = 2^3 \times 3 \times 5$ (1). HCF $= 2^2 \times 3 = 12$; LCM $= 2^3 \times 3 \times 5 \times 7 = 840$ (1).

7. $(x + 2)(x + 5)$ (1), so the zeroes are -2 and -5 (1).

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official MPBSE paper.

8. No solution when $\frac{k}{2} = \frac{3}{6} \neq \frac{5}{7}$ (1), so k = 1 (1).

9. Equal roots need D = 0: 16 − 4k = 0 (1), so k = 4 (1).

10. a = 1, d = 3: $S_{20} = \frac{20}{2}(2 + 19 \times 3)$ (1) = 10 × 59 = 590 (1).

11. The triangles formed are similar, so height/shadow is the same: h/28 = 6/4 (1), h = 42 m (1).

12. $(x - 3)^2 + 16 = 25$ (1), so x − 3 = ±3 and x = 6 or 0 (1).

13. $2(1) + \frac{3}{4} - \frac{3}{4}$ (1) = 2 (1).

14. sin 60° = h/60 (1), so $h = 30\sqrt{3}$ m ≈ 51.96 m (1).

15. The radius is perpendicular to the tangent (1), so $r = \sqrt{10^2 - 8^2} = 6$ cm (1).

16. 2πr = 44 gives r = 7 cm (1). Quadrant = ¼ × 22/7 × 49 = 38.5 cm² (1).

17. A non-leap year has 52 weeks and 1 extra day (1). The extra day is a Sunday in 1 of 7 cases, so P = 1/7 (1).

18. Multiply the first equation by 3: 9x − 3y = 21 (1). Adding to the second: 11x = 22, so x = 2 (1). Then y = 3 × 2 − 7 = −1 (1).

OR 9 = 3², 12 = 2² × 3, 15 = 3 × 5 (1). LCM = 2² × 3² × 5 = 180 minutes (1). They ring together again after 3 hours, at 11 a.m. (1).

19. Let the ratio be k : 1. The y-coordinate of the point is $\frac{6k-3}{k+1} = 0$ (1), so k = 1/2 and the ratio is 1 : 2 (1). x = (1 × 5 + 2 × 2)/3 = 3; the point is (3, 0) (1).

OR OA = 6, OB = 8, $AB = \sqrt{36 + 64} = 10$ (1). Perimeter = 24 units (1). Since 6² + 8² = 10², it is a right triangle, right-angled at O (1).

20. Cumulative frequencies 3, 10, 22, 32, 40; N/2 = 20, so the median class is 20–30 (1). l = 20, cf = 10, f = 12, h = 10 (1). Median $= 20 + \frac{20-10}{12} \times 10 \approx 28.33$ (1).

OR (a) (2, 6), (3, 5), (4, 4), (5, 3), (6, 2): 5/36 (1). (b) (1, 6), (6, 1), (2, 3), (3, 2): 4/36 = 1/9 (1). (c) 6/36 = 1/6 (1).

21. Let the numbers be x and x + 3: x(x + 3) = 504 (1). $x^2 + 3x - 504 = 0$, i.e. (x + 24)(x − 21) = 0 (1½). The numbers are positive, so x = 21 (½). The numbers are 21 and 24 (1).

OR a + 3d = 14 and a + 8d = 34, so 5d = 20 and d = 4, a = 2 (2). The AP is 2, 6, 10, … (½). $S_{15} = \frac{15}{2}(4 + 14 \times 4) = 450$ (1½).

22. LHS $= \cos A \cdot \frac{(1+\sin A)+(1-\sin A)}{(1-\sin A)(1+\sin A)}$ (1½) $= \frac{2\cos A}{1-\sin^2 A}$ (1) $= \frac{2\cos A}{\cos^2 A} = \frac{2}{\cos A} = 2\sec A$ = RHS (1½).

OR Standing part: tan 30° = h_1/12, so $h_1 = \frac{12}{\sqrt{3}} = 4\sqrt{3}$ m (1½). Broken part: cos 30° = 12/h_2, so $h_2 = \frac{24}{\sqrt{3}} = 8\sqrt{3}$ m (1½). Height $= 12\sqrt{3}$ m ≈ 20.78 m (1).

23. r = 3.5 cm and the cylinder is 20 − 7 = 13 cm long (1). Cylinder: $\pi r^2 h = \frac{22}{7} \times 12.25 \times 13 = 500.5$ cm³ (1). Two hemispheres make a sphere: $\frac{4}{3}\pi r^3 = \frac{4}{3} \times \frac{22}{7} \times 42.875 \approx 179.67$ cm³ (1). Volume ≈ 680.17 cm³ (1).

OR Class marks 10, 30, 50, 70, 90 (1). fx = 60, 300, 600, 560, 360; Σfx = 1880 (1½). Σf = 40, so the mean = 1880/40 = 47 (1½).

© 2026 JEEInfo (www.jeeinfo.in). Free for personal study only. Do not copy, sell or republish without written permission. Not an official MPBSE paper.