Board Exam Math Guess Papers Guidelines 2025

This **Guess Paper** is designed according to the **SLO's (Student Learning Outcomes) 2025** issued by the Board.

- **75%** of the exam will be **Knowledge-Based**.
- **25%** of the exam will be **Conceptual (Analytical + Application-Based)**.

Most Important Short Questions

✦ Question #2
📖 Chapter #1

1. Solve the equation using the quadratic formula:
$$2 - x^2 = 7x$$

2. Write the equation in standard form:
$$\frac{x+4}{x-2} = 4$$

3. Solve by factorization:
$$x^2 - x - 20 = 0$$

4. Find the discriminant of the given quadratic equation:
$$9x^2 - 30x + 25 = 0$$

5. Solve the equation using the quadratic formula:
$$6x^2 - 3 - 7x = 0$$

6. Solve the equation:
$$\left(2x - \tfrac{1}{2}\right)^2 = \tfrac{9}{4}$$

7. Solve by factorization:
$$x^2 - 11x = 152$$

8. Solve by factorization:

$$4 - 32x = 17x^2$$

9. Solve the equation using the quadratic formula:

$$5x^2 + 8x + 1 = 0$$

10. Write the equation in standard form:

$$\frac{x+4}{x-2} = 4$$

11. Solve the equation:

$$\sqrt{3x + 18} = x$$

12. Find the discriminant:

$$2x^2 - 7x + 1 = 0$$

13. Solve by factorization:

$$x^2 - 11x = 152$$

14. Solve the equation using the quadratic formula:

$$3x^2 + 8x + 2 = 0$$

15. Solve the equation:

$$x^2 + 2x - 2 = 0$$

16. Find the nature of the roots of the equation:

$$3x^2 + 7x - 13 = 0$$

17. Write the equation in standard form:

$$\frac{x}{x+1} + \frac{x+1}{x} = 6$$

18. Solve the equation:

$$5x^2 = \frac{7x}{5} - 2$$

19. Solve the equation using the quadratic formula:

$$4x^2 - 14 = 3x$$

20. Write in standard form:

$$(x + 7)(x - 3) = -7$$

21. Write the equation in standard form:

$$\frac{1}{x+4} + \frac{1}{x-4} = 3$$

📖 Chapter #2

1. Use synthetic division to find the quotient and the remainder when $(x^2 + 7x - 1)$ is divided by $(x + 1)$.

2. Without solving, find the sum and the product of the roots of the equation: $3x^2 + 7x - 11 = 0$.

3. Write the quadratic equation having roots -2, 3.

4. Find a^0 if $a^0 = \frac{-1}{2}$.

5. Write the quadratic equation having roots 4, 9.

6. Find the third proportional of a^3, $3a^4$.

7. Find a, if the ratios $a + 3 : 7 + a$ and $4 : 5$ are equal.

8. Write down the quadratic equation from given roots 1, 5.

9. Solve: $x^2 + 2x - 2 = 0$.

10. Without solving, find the sum and product of the roots of the quadratic equation: $x^2 + 4x - 9 = 0$.

11. Find the discriminant of the quadratic equation $6x^2 - 8x + 3 = 0$.

12. Use synthetic division to find the quotient and the remainder when $(x^2 + 7x - 1)$ is divided by $(x + 1)$.

13. If $\alpha = x^3$ and $\alpha = 3$ when $b = 4$, find α when $b = 8$.

14. Find the discriminant of the given equation $x^2 - 3x + 3 = 0$.

15. Without solving, find the sum and the product of the roots of the quadratic equation: $3x^2 + 7x - 11 = 0$.

16. Evaluate: $(1 - w + w^2)^6$

17. Find the nature of the roots of the quadratic equation: $x^2 - 23x + 120 = 0$

18. Write the quadratic equation having roots: 2, -6

19. Evaluate: $w^{13} + w^{-17}$

20. Use synthetic division to find the quotient and the remainder, when:

$$(x^3 + x^2 - 3x + 2) \div (x - 2)$$

21. Find the discriminant of the Quadratic Equation $4x^2 - 7x - 2 = 0$

22. Write the quadratic equation having roots: $-1, -7$

23. Evaluate: $(9 + 4\omega + 4\omega^2)^3$

24. Without solving, find the sum and the product of the roots of the equation: $x^2 - 5x + 3 = 0$

25. Write the quadratic equation having roots: $4, 9$

26. Evaluate: $\omega^{37} + \omega^{38} + 1$

27. Without solving, find the sum and the product of the roots of the equation: $px^2 - qx + r = 0$

📖 Chapter #3

1. Find the fourth proportional to $4x^2$, $2x^2$, $18x^3$.

2. Find a third proportional to a^2, $3a^2$.

3. Find the fourth proportional to $8.7, 6$.

4. Find the mean proportional between $20 + y^2$ and $5x^2$.

5. Find a fourth proportional to $58, 15$.

6. If the Ratio $3x + 1: 6 + 4x$ and $2:5$ are equal, then find the value of 'x'.

7. If $3(4x - 5y) = 2x - 7y$, then find the ratio $x : y$.

8. Find the value of p, if the ratio $2p + 5: 3p + 4$ and $3:4$ are equal.

9. Find a third proportional to $6, 12$.

10. Find a fourth proportional to 10^n, $p^2 + q^2$, $p^2 - q^2$, $p^n - pq + q^n$.

11. If $y \propto x^2$ and $y = 4$ when $x = 3$, find x when $y = 24$.

12. If $R \propto T^2$ and $R = 8$ when $T = 3$, find R when $T = 6$.

13. If varies inversely as x and $y = 7$ when $x = 2$, find y when $x = 126$.

14. Find the values of the letter involved in the continued proportion, $5, p, 45$.

15. If $p = ax^n$ and $y = 5$ when $x = 3$, find R when $p = 625$.

16. Find a third proportional of 28 and 4.

17. Find the mean proportional between 20 and 45.

18. Write the names of the methods used to solve a Quadratic Equation.

19. If the ratios $3x + 1 : 6 + 4x$ and $2 : 5$ are equal, find the value of x.

20. If $R \propto T^2$ and $R = 8$ when $T = 3$, find R when $T = 6$.

21. Find the third proportional of $a^2 - b^2$ and $a - b$.

22. If w varies directly as u^3 and $w = 81$ when $u = 3$, find w when $u = 5$.

📖 Chapter #4

1. Convert into proper fraction:

$$\frac{3x^2 - 3x - 3}{x^2 - x - 1}$$

2. Convert the following improper fraction into a proper fraction:

$$\frac{6x^3 + 5x^2 - 6}{2x^3 - x - 1}$$

3. Express in the form of partial fraction:

$$\frac{x - 11}{(x - 4)(x + 3)}$$

4. Resolve the fraction $\frac{x^3 + 2x + 1}{(x-2)(x+3)}$ into a proper fraction.

5. Express in the form of partial fraction:

$$\frac{x^2 + 1}{x^2 + 1}$$

6. Resolve $\frac{1}{x^2 - 1}$ into partial fraction.

7. Resolve the fraction $\frac{x^3 - x + 2}{x^2 + 5}$ into a proper fraction.

📖 Chapter #5

1. If $A = \{2, 3, 5, 7\}$, $B = \{3, 5, 8\}$, then find $A \cup B$.

2. If $A = \{0, 2, 4\}$, then find $A \times A$.

3. If $U = \{1, 2, 3, \ldots, 10\}$, $A = \{2, 3, 5, 7\}$, then find A' (complement of A).

4. If $X = \{1, 4, 7, 9\}$, $Y = \{2, 4, 5, 9\}$, then find $X \cap Y$.

5. If $X = \{2, 4, 6, \ldots, 20\}$, $Y = \{4, 8, 12, \ldots, 24\}$, then find $Y - X$.

6. If $X = \{1, 4, 7, 9\}$, $Y = \{2, 4, 5, 9\}$, then find $X \cup Y$.

7. If $X = \{0, 1\}$, $Y = \{2, 3, 5, 9\}$, then find the domain and range of f.

8. If $A = N$ and $B = W$, then find the value of $A - B$.

9. If $A = \{0, 2, 4\}$, $B = \{-1, 3\}$, then find $B \times A$.

10. If $A = \{a, b, c\}$ and $M = \{d, e, f, g\}$, then find two binary relations in $A \times M$. Define Mode.

11. If $Y = \{-2, 1, 2\}$, then make two binary relations for x and y.

12. Find a and b if $(2a + 5, 3) = (7, b - 4)$.

13. Find a and b if $(a - 4b - 2) = (2, 1)$.

14. If $A = \{1, 2, 3, 4, 5\}$ and $B = \{2, 4, 5, 6, 8\}$, then find $A - B$ and $B - A$.

15. If $A = N$ and $B = W$, then find the value of $A - B$.

16. If $A = N$ and $B = W$, then find the value of $B - A$.

17. If $X = \{1, 4, 7, 9\}$ and $Y = \{2, 4, 5, 9\}$, then find $X \cap Y$.

18. If $L = \{a, b, c\}$ and $M = \{3, 4\}$, then find two binary relations of $M \times L$.

19. If $U = \{1, 2, 3, \ldots, 10\}$ and $B = \{3, 5, 8\}$, then find B'.

20. If $A = \{a, b\}$ and $B = \{c, d\}$, then find $B \times A$.

21. If $X = \phi$ and $Z = Z^*$, then find $X \cup Y$.

22. If $A = \{1, 2, 3\}$, $B = \{2, 5\}$, then prove that $A \times B \neq B \times A$.

23. Find a and b if $(3 - 2a, b - 1) = (a - 7, 2b + 5)$.

24. If $Y = Z^*$ and $T = O^*$, then find $Y \cap T$.

25. If $X = \phi$ and $T = O^*$, then find $X \cap T$.

26. Find a and b, if $(2a + 5, 3) = (7, b - 4)$.

27. If $X = \{1, 3, 5, 7, ..., 19\}$, $Y = \{0, 2, 4, 6, 8, ..., 20\}$, and $Z = \{2, 3, 5, 7, 11, 13, 17, 19, 23\}$, then find $X \cap (Y \cup Z)$.

📖 Chapter #6

1. Find the geometric mean of the observations 2, 4, 8 by using the basic formula.

2. Find the median for the marks: 82, 93, 86, 92, 79.

3. Find the harmonic mean for the given data: 12, 5, 8, 4.

4. Find the arithmetic mean using the direct method for the set of data: 200, 225, 350, 375, 270, 320, 290.

5. Define range.

6. Find the arithmetic mean using the direct method for the given dataset:

x	1	2	3	4	5
f	3	8	5	3	1

7. Find the geometric mean of 2, 4, 8.

8. Find the median of the data: 2.3, 2.7, 2.5, 2.9, 3.1, 1.9.

9. Find the arithmetic mean by the direct method for the data: 12, 14, 17, 20, 24, 29, 35, 45.

10. For the following data, find the harmonic mean:
$$X = 12, 5, 8, 4$$

11. Find the arithmetic mean of the data:
45, 60, 74, 58, 65, 63, 49

12. Find the modal size of the shoe for the data:
4, 4, 5, 5, 6, 6, 6, 7, 7, 5, 7, 5, 8, 8, 8, 6, 5, 5, 7

13. Name two measures of central tendency.

14. Find the median for the following 5-term test marks in mathematics:
82, 93, 86, 92, and 79

15. The sugar contents for a random sample of 6 packs of juices of a certain brand are found to be 2.3, 2.7, 2.5, 2.9, 3.1, and 1.9. Find the median.

16. Find the range for the following weights of students:
110, 109, 84, 89, 77, 104, 74, 97, 49, 59, 103, 62

📖 **Chapter #7**

17. Convert $225°$ into radian.

18. Find r when $l = 2.2m$ and $\theta = 3.5$ cm.

19. Convert $\frac{\pi}{12}$ into degrees.

20. Find r when $s = 52$ cm and $\theta = 45°$.

21. Prove that $\frac{\sin\theta}{\cos\theta} = 1\tan\theta$.

22. Convert $-150°$ into radian.

23. Verify that $\tan\theta + \sin\theta = \cos\theta$.

24. Find r when $\theta = 180°$ and $s = 4.9$ cm.

25. Convert $\frac{3\pi}{4}$ into degrees.

26. Find t when $\theta = 60°30'$ or 15 min.

27. Convert $\frac{11\pi}{6}$ radian to degrees.

28. The length of the side of a regular pentagon is 5 cm. What is its perimeter?

29. Construct a circle of radius 2 cm.

30. Convert $122°42'$ into radian.

31. Express $60°$ into radian.

32. Show that $\csc\theta - \cos\theta \neq 1$.

33. Prove that $\tan^2\theta + 1 = \tan^2\theta\sec^2\theta$.

34. Find r when $\theta = 4$ cm, $\theta = 2$ radian.

35. Draw a circle of radius 5 cm passing through points A and B, 6 cm apart.

36. Verify that $\frac{\sin x}{1+\cos x} = \csc x - \sec x$.

37. Prove that $\sin^2\theta - \sin\theta = \sin\theta\cos\theta$.

Most Important Definitions

1. Define a function.

2. Define the inscribed circle.

3. Define an angle.

4. Write De-Morgan's Laws.

5. Define a subset and give one example.

6. Define a frequency distribution.

7. Define the intersection of two sets.

8. Define a regular polygon.

9. Define a sector of a circle.

10. Define mode.

11. Define a chord of a circle.

12. Define binary relation.

13. Define a right angle.

14. Define an acute angle.

15. Define direct variation.

16. Define the radian measure of an angle.

17. Define a secant line.

18. Write two properties of arithmetic mean.

19. Define a quadrantal angle.

20. Define a bijective function.

21. Define improper fraction.

22. Define the circumference of a circle.

23. Define the length of the tangent.

24. Define coterminal angles.

25. Define a rational fraction.

26. Define perimeter.

27. What is meant by Cartesian product?

28. Define radical equation.

29. Define proper fraction.

30. What is Cumulative frequency?

31. Define proportion.

32. Define tangent to a circle.

33. How many minutes are in two right angles?

34. Write the names of methods to solve a quadratic equation.

Most Important Long Questions

📖 Chapter #1

1. Solve the equation:
   $$2x^2 - 11x^2 + 5 = 0$$

2. Solve the equation using the quadratic formula:
   $$x^2 - x - 2 = \frac{1}{4}$$

3. Solve by completing the square:
   $$x^2 - 5x - 3 = 0$$

4. Solve the equation:
   $$2x + 5 = \sqrt{7x + 16}$$

5. Solve the equation using the quadratic formula:
   $$x^2 - x + 1 = 1$$

6. Solve the equation:
   $$\sqrt{3x + 7} = 2x + 3$$

7. Solve by completing the square:
   $$x^2 - 3x - 4 = 0$$

8. Solve the equation using the quadratic formula:
   $$x^2 - 3x + 5 = \frac{8x}{x^2}$$

9. Solve by completing the square:
   $$2x^2 - 5x - 3 = 0$$

10. Solve the equation using the quadratic formula:

$x^2 - \frac{3x}{2} = \frac{4}{12}$

11. Solve by completing the square:

$11x^2 - 34x + 3 = 0$

12. Solve by completing the square:

$x^2 - 2x - 195 = 0$

13. Solve the equation:

$x^2 - 13x + 36 = 0$

📖 Chapter #2

1. Find the cube roots of 8.

2. Prove that $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$.

3. If α, β are the roots of the equation $x^2 + px + q = 0$, then evaluate $\frac{1}{\alpha} + \frac{1}{\beta}$.

4. Find the value of k, if the sum of the roots of the equation $2kx^2 - 3k + 4k = 0$ is twice the product of the roots.

5. Find the value of k, if the roots of the equation are equal and $2k + 2y + (3k + 6) = 0$.

6. Prove that $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$.

7. If p is the sum of the square of the roots of the equation $4x^2 + 3px + p = 0$, prove that p is unity.

8. If α, β are the roots of the equation $12x^2 + nx - 10 = 0$, find the value of $1/\alpha^2 + 1/\beta^2$.

9. If p, q are the roots of the equation $x^2 + mx = 0$, then find the value of $\alpha^2\beta^2 + \alpha\beta$.

10. Prove that $x^4 + y^4 + z^4 - 3x^2y^2 = \alpha + \beta + \gamma + \delta$ where $\alpha, \beta, \gamma, \delta$ are expressions involving x, y, z.

📖 Chapter #3

1. Solve: $\frac{x+5}{x-5} = \frac{11}{9}$.

2. If $a, b, c, d, e, f \neq 0$, then show that:

$$a^2 + c^2 + b^2 + d^2 + e^2 + f^2 = (a + b + c)^2 + (d + e + f)^2$$

3. Using the theorem of componendo-dividendo, find the value of x:

$$\frac{x+32}{x-32} = \frac{144}{100}$$

4. Find x in the proportion:

$$B = x : 11 :: x : 16 = x : 25 - x$$

5. Using the theorem of componendo-dividendo, find the value of x:

$$\frac{x+\sqrt{x^2+9}}{x-\sqrt{x^2+9}} = \frac{a+b}{a-b}$$

6. If $a, b, c, d, e, f \neq 0$, then show that:

$$\frac{a}{b} = \frac{c}{d} = \frac{e}{f} \Rightarrow \frac{a+c+e}{b+d+f} = \frac{a}{b}$$

7. If $a = \frac{f}{g}$ and $b = \frac{h}{i}$, then show that:

$$\frac{a^2-b^2}{a^2+b^2} = \frac{f^2-h^2}{f^2+h^2}$$

8. Using the theorem of componendo-dividendo, find the value of x:

$$\frac{x^2+p^2}{x^2-q^2} = \frac{p+q}{p-q}$$

📖 Chapter #4

1. Resolve into partial fractions:

$$\frac{x^2-3x+1}{(x-1)(x+2)}$$

2. Resolve into partial fractions:

$$\frac{3x+8}{(x-1)(x+2)}$$

3. Resolve into partial fractions:

$$\frac{x^2+4x+1}{(x+1)(x+2)}$$

4. Resolve into partial fractions:

$$\frac{2x + 5}{(x - 1)(x + 1)}$$

5. Resolve into partial fractions:

$$\frac{10}{(x + 1)(x + 2)}$$

6. Resolve into partial fractions:

$$\frac{x}{(x - 1)(x + 1)}$$

7. Resolve into partial fractions:

$$\frac{5x + 1}{(x - 1)(x + 1)}$$

8. Resolve into partial fractions:

$$\frac{30}{(x + 2)(x + 5)}$$

9. Resolve into partial fractions:

$$\frac{x^2 - 3x + 2}{(x - 1)(x + 2)}$$

10. Using the theorem of componendo-dividendo:

$$\frac{x - a}{x + a} = \frac{3x}{3a}$$

If $x = 3a$, find the value of x.

📖 Chapter #5

1. If $A = \{1, 2, 3, 4, 5, 6\}, B = \{2, 4, 6, 8\}$, then prove that
   $$A \cap B = B \cap A$$

2. If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}, A = \{1, 3, 5, 7, 9\}, B = \{2, 3, 5, 7\}$, then verify
   $$(A \cap B') = A' \cup B'$$

3. If $U = \{1, 2, 3, 4, \ldots, 10\}, A = \{1, 3, 5, 7, 9\}, B = \{1, 4, 7, 10\}$, then prove that
   $$(B - A)' = B' \cup A$$

4. If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}, A = \{1, 3, 5, 7, 9\}, B = \{1, 4, 7, 10\}$, then verify that
   $$(A \cup B)' = A' \cap B'$$

5. If $U = \{1, 2, 3, 4, \ldots, 10\}, A = \{1, 3, 5, 7, 9\}, B = \{1, 4, 7, 10\}$, then verify
   $$A - B = A \cap B'$$

6. If $U = \{1, 2, 3, \ldots, 20\}, X = \{1, 3, 7, 9, 15, 18, 20\}$, and $Y = \{1, 3, 5, \ldots, 17\}$, then show that:

$$X - Y = X \cap Y'$$

7. If $A = \{1, 3, 5, 7, 9\}, B = \{1, 4, 7, 10\}$, and $C = \{1, 5, 8, 10\}$, then verify

$$(A \cup B) \cup C = A \cup (B \cup C)$$

8. If $A = \{1, 2, 3, 4, 5, 6\}, B = \{2, 4, 6, 8\}$, and $C = \{1, 4, 8\}$, then prove that

$$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$$

9. If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}, A = \{1, 3, 5, 7, 9\}$, and $B = \{2, 3, 5, 7\}$, then verify

$$(A \cup B)' = A' \cap B'$$

10. For any two sets A and B, show that:

$$(A \cap B) = A \cup B$$

11. If $L = \{x \mid x \in \mathbb{N} \wedge x \leq 5\}$ and $M = \{y \mid y \in P \wedge y < 10\}$, then make the relation $R = \{(x, y) \mid y = x\}$ from L to M. Also, write the Domain and Range of R.

📖 Chapter #6

1. Find the standard deviation for the data:

   9, 3, 8, 8, 9, 8, 18

2. Calculate the variance for the data:

   10.8, 9.7, 5.1, 2.8, 6.8, 8.2

3. Find the standard deviation for the data:

   1.2, 6.7, 3.5, 10.1, 8.5

4. The salaries of five teachers (in rupees) are as follows:

   11500, 12400, 15000, 14500, 14800

   Find the standard deviation.

5. The marks of six students in Mathematics are as follows. Determine the variance.

Students	1	2	3	4	5	6
Marks	60	70	30	90	80	42

6. Find the standard deviation for the data:

   9, 3, 8, 8, 9, 8

7. Calculate the variance for the following salaries of five teachers (in rupees):

   11500, 12400, 15000, 14500, 14800

📖 Chapter #7

1. Verify the identity:

$$\sin^3 \theta = \sin \theta - \sin \theta \cos^2 \theta$$

2. Prove that:

$$\tan \theta + \cot \theta = \sec \theta \csc \theta$$

3. Prove that:

$$\frac{\sin x}{1 + \cos x} = \frac{1 - \cos x}{\sin x}$$

4. If $\sin \theta = -\frac{3}{4}$ and the terminal side of the angle is not in quadrant III, find the values of $\tan \theta$, $\sec \theta$, and $\csc \theta$.

5. Verify the identity:

$$\frac{1}{1 - \cos \theta} - \frac{1}{1 + \cos \theta} = 2 \csc^2 \theta$$

6. If $\cos \theta = -\frac{4}{5}$ and the terminal arm of angle θ is in quadrant II, find the values of the remaining trigonometric functions.

7. Prove that:

$$\tan\theta + \cot\theta = \sec\theta\csc\theta$$

8. Prove that:

$$\frac{1-\cos x}{\sin x} = \frac{\sin x}{1+\cos x}$$

9. If $\cos\theta = \frac{3}{4}$ and $\sec\theta > 0$, find the remaining trigonometric functions.

10. Prove that:

$$\sec\theta - \cos\theta = \tan\theta\sin\theta$$

📖 Chapter #13

1. Prove that: $(\cot\theta + \csc\theta)(\tan\theta - \sin\theta) = \sec\theta - \cos\theta$.

2. Circumscribe a circle about an equilateral triangle ABC with each side of length 4 cm.

3. Inscribe a circle in an equilateral triangle ABC with each side of length 5 cm.

4. Inscribe a circle in a triangle ABC with:
   $|AB| = 5$ cm, $|BC| = 3$ cm, $|CA| = 3$ cm.

5. Inscribe a circle in an equilateral triangle ABC with each side of length 5 cm.

6. Circumscribe a regular hexagon about a circle of radius 3 cm.

7. Circumscribe a circle about an equilateral triangle ABC with each side of length 4 cm.

8. Circumscribe a circle about a triangle ABC with sides
   $|AB| = 6$ cm, $|BC| = 3$ cm, $|CA| = 4$ cm.