# Grade 10 - Final Exam

## Answer Keys

Practice Papers 1 & 2 (75 Marks)

Mathematics

Based on Maharashtra Board Syllabus (NEP 2025-26) - Full Syllabus

### Note:

This document contains the answer keys for Final Exam Practice Paper 1 and Practice Paper 2 (75 Marks).

## Practice Paper 1 - Answer Key

**Section A: Linear Equations in Two Variables**

1. Solution: x = 5, y = 0 (Multiply second equation by 2: 2x - 4y = 4. Subtract from first equation: (2x + 3y) - (2x - 4y) = 11 - 4 -> 7y = 7 -> y = 1. Substitute y=1 in x - 2y = 2: x - 2(1) = 2 -> x - 2 = 2 -> x = 4. **Correction:** x+y=5, x-y=1. Adding: 2x=6, x=3. Subtracting: 2y=4, y=2. Let's use the equations from the prompt: 2x + 3y = 11, x - 2y = 2. Multiply second eq by 2: 2x - 4y = 4. Subtract this from first: (2x + 3y) - (2x - 4y) = 11 - 4 -> 7y = 7 -> y = 1. Substitute y=1 in x - 2y = 2: x - 2(1) = 2 -> x - 2 = 2 -> x = 4. **Revised Answer:** x = 4, y = 1)

2. Solution: x = 3, y = 2 (From second equation, y = 2x - 4. Substitute into first: x + 2(2x - 4) = 7 -> x + 4x - 8 = 7 -> 5x = 15 -> x = 3. Substitute x=3 in y = 2x - 4: y = 2(3) - 4 = 6 - 4 = 2)

**Section B: Quadratic Equations**

3. Roots: $x = 4$, $x = 5$ ($x^2 - 9x + 20 = 0$ -> $(x - 4)(x - 5) = 0$)

4. Roots: $x = 1$, $x = -5$ ($x^2 + 4x - 5 = 0$. $\Delta = 4^2 - 4(1)(-5) = 16 + 20 = 36$. $x = [-4 \pm \sqrt{36}] / 2(1) = [-4 \pm 6] / 2$. $x_1 = (-4 + 6)/2 = 2/2 = 1$. $x_2 = (-4 - 6)/2 = -10/2 = -5$)

**Section C: Arithmetic Progression**

5. 18th term ($a_{18}$) = 91 ($a = 6$, $d = 5$, $n = 18$. $a_{18} = a + (n-1)d = 6 + (18-1)5 = 6 + 17*5 = 6 + 85$)

6. Sum ($S_{14}$) = 602 ($a = 8$, $d = 5$, $n = 14$. $S_{14} = n/2 * [2a + (n-1)d] = 14/2 * [2(8) + (14-1)5] = 7 * [16 + 13*5] = 7 * [16 + 65] = 7 * 81$. **Correction:** $S_{14} = 7 * [16 + 65] = 7 * 81 = 567$. Let's recheck the AP: 8, 13, 18, 23. $d=5$. $a=8$. $S_{14} = 14/2 * (2*8 + (14-1)*5) = 7 * (16 + 13*5) = 7 * (16 + 65) = 7 * 81 = 567$. **Revised Answer:** 567)

**Section D: Probability**

7. a) A blue ball? = 7/15 (Total balls = 5 + 7 + 3 = 15. Blue balls = 7)

7. b) A green ball? = 3/15 or 1/5 (Total balls = 15. Green balls = 3)

8. a) A vowel? = 4/11 (Vowels in MATHEMATICS: A, E, A, I. Total letters = 11)

8. b) The letter 'A'? = 2/11 (Letter 'A' appears twice. Total letters = 11)

8. c) A consonant? = 7/11 (Consonants in MATHEMATICS: M, T, H, M, T, C, S. Total letters = 11)

**Section E: Statistics**

9. Mean = 24 (Sum = 12 + 18 + 24 + 30 + 36 = 120. Count = 5. Mean = 120/5)

10. Mode = 3 (The number that appears most frequently)

10. Median = 2.5 (Data sorted: 1, 2, 2, 3, 3, 4. Median is the average of the two middle values: (2 + 3) / 2)

**Section F: Geometry and Trigonometry**

11. AC = 17 cm (Using Pythagoras theorem: $AC^2 = AB^2 + BC^2 = 8^2 + 15^2 = 64 + 225 = 289$. AC = $\sqrt{289}$)

12. a) sin 30° + cos 60° = 1 (1/2 + 1/2)

12. b) tan 45° × cot 45° = 1 (1 × 1)

13. EC = 6 cm (Using Basic Proportionality Theorem (Thales' Theorem): AD/DB = AE/EC -> 2/3 = 4/EC -> 2*EC = 12 -> EC = 6)

14. a) Distance AB = 5 units (Distance formula: $\sqrt{[(x2 - x1)^2 + (y2 - y1)^2]} = \sqrt{[(5 - 2)^2 + (7 - 3)^2]} = \sqrt{[3^2 + 4^2]} = \sqrt{[9 + 16]} = \sqrt{25}$)

14. b) Midpoint coordinates = (1, 1) (Midpoint formula: [(x1 + x2)/2, (y1 + y2)/2] = [(-1 + 3)/2, (4 + (-2))/2] = [2/2, 2/2])

# Practice Paper 2 - Answer Key

**Section A: Linear Equations in Two Variables**

1. Solution: x = 2, y = 1 (From second equation, x = y + 1. Substitute into first: 3(y + 1) - 5y = 1 -> 3y + 3 - 5y = 1 -> -2y = -2 -> y = 1. Substitute y=1 in x = y + 1: x = 1 + 1 = 2)

2. Solution: x = 1, y = 2 (From first equation, x = 6 - 3y. Substitute into second: 2(6 - 3y) - y = 5 -> 12 - 6y - y = 5 -> 12 - 7y = 5 -> 7 = 7y -> y = 1. Substitute y=1 in x = 6 - 3y: x = 6 - 3(1) = 6 - 3 = 3. **Correction:** x + 3y = 6, 2x - y = 5. From second eq, y = 2x - 5. Substitute into first: x + 3(2x - 5) = 6 -> x + 6x - 15 = 6 ->

7x = 21 -> x = 3. Substitute x=3 in y = 2x - 5: y = 2(3) - 5 = 6 - 5 = 1. **Revised Answer:** x = 3, y = 1)

## Section B: Quadratic Equations

3. Roots: x = -3, x = -5 ($x^2$ + 8x + 15 = 0 -> (x + 3)(x + 5) = 0)

4. Roots: x = 2, x = 4 ($x^2$ - 6x + 8 = 0. $\Delta$ = $(-6)^2$ - 4(1)(8) = 36 - 32 = 4. x = [-(-6) ± $\sqrt{4}$] / 2(1) = [6 ± 2] / 2. x1 = (6 + 2)/2 = 8/2 = 4. x2 = (6 - 2)/2 = 4/2 = 2)

## Section C: Arithmetic Progression

5. 20th term ($a_{20}$) = 105 (a = 10, d = 5, n = 20. $a_{20}$ = a + (n-1)d = 10 + (20-1)5 = 10 + 19*5 = 10 + 95)

6. Sum ($S_{18}$) = 666 (a = 5, d = 4, n = 18. $S_{18}$ = n/2 * [2a + (n-1)d] = 18/2 * [2(5) + (18-1)4] = 9 * [10 + 17*4] = 9 * [10 + 68] = 9 * 78)

## Section D: Probability

7. a) A red marble? = 8/20 or 2/5 (Total marbles = 8 + 5 + 7 = 20. Red marbles = 8)

7. b) A blue marble? = 5/20 or 1/4 (Total marbles = 20. Blue marbles = 5)

8. a) A number greater than 3? = 3/6 or 1/2 (Numbers greater than 3: 4, 5, 6. Total outcomes = 6)

8. b) A number less than or equal to 2? = 2/6 or 1/3 (Numbers less than or equal to 2: 1, 2. Total outcomes = 6)

8. c) An even number? = 3/6 or 1/2 (Even numbers on a die: 2, 4, 6. Total outcomes = 6)

**Section E: Statistics**

9. Mean = 30 (Sum = 20 + 25 + 30 + 35 + 40 = 150. Count = 5. Mean = 150/5)

10. Mode = 70 (The number that appears most frequently)

10. Median = 77.5 (Data sorted: 70, 70, 70, 85, 85, 90. Median is the average of the two middle values: (70 + 85) / 2)

**Section F: Geometry and Trigonometry**

11. PR = 13 cm (Using Pythagoras theorem: $PR^2 = PQ^2 + QR^2 = 12^2 + 5^2 = 144 + 25 = 169$. PR = $\sqrt{169}$)

12. a) cos 30° + sin 60° = $\sqrt{3}$ ($\sqrt{3}/2 + \sqrt{3}/2$)

12. b) tan 60° × cot 60° = 1 ($\sqrt{3} \times 1/\sqrt{3}$)

13. YR = 4 cm (Using Basic Proportionality Theorem (Thales' Theorem): PX/XQ = PY/YR -> 3/6 = 2/YR -> 3*YR = 12 -> YR = 4)

14. a) Distance CD = 5 units (Distance formula: $\sqrt{[(x2 - x1)^2 + (y2 - y1)^2]} = \sqrt{[(1 - (-3))^2 + (8 - 5)^2]} = \sqrt{[4^2 + 3^2]} = \sqrt{[16 + 9]} = \sqrt{25}$)

14. b) Coordinates of the dividing point = (3, 3) (Section formula: [(m*x2 + n*x1)/(m+n), (m*y2 + n*y1)/(m+n)]. m=2, n=1. x1=1, y1=-3. x2=4, y2=6. [(2*4 + 1*1)/(2+1), (2*6 + 1*(-3))/(2+1)] = [(8 + 1)/3, (12 - 3)/3] = [9/3, 9/3] = [3, 3])

*End of Answer Keys*