



MATHS

BOOKS - HT Olympiad Previous Year Paper

QUADRATIC EQUATIONS

Mathematical Reasoning

1. The roots of $ax^2 + bx + c = 0$, $a \neq 0$ are real and unequal, if $(b^2 - 4ac)$

A. $= 0$

B. > 0

C. < 0

D. ≥ 0

Answer: B



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2. If 2 is a root of the equation $x^2 + kx + 12 = 0$ and the equation

$x^2 + kx + q = 0$ has equal roots, find the value of q .

A. 8

B. -8

C. 16

D. -16

Answer: C



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3. If one of the roots of the equation $a(b - c)$

$$x^2 + b(c - a)x + c(a - b) = 0 \text{ is } 1. \text{ then}$$

what is the second root?

A. $\frac{b(c - a)}{a(b - c)}$

B. $\frac{a(b - c)}{c(a - b)}$

C. $\frac{a(b - c)}{b(c - a)}$

D. $\frac{c(a - b)}{a(b - c)}$

Answer: D



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4. If the roots of the quadratic equation $(a - b)x^2 + (b - c)x + (c - a) = 0$ are equal, prove that $b + c = 2a$

A. $2b = a + c$

B. $2a = b + c$

C. $2c = a + b$

D. $\frac{1}{b} = \frac{1}{a} + \frac{1}{c}$

Answer: B



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5. Two students while solving a quadratic equation in x , one copied the constant term incorrectly and got the roots 3 and 2. The other copied the constant term and coefficient of x^2 correctly as -6 and 1 respectively. The correct roots are

A. 3, - 2

B. - 3, 2

C. - 6, - 1

D. 6, - 1

Answer: D



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6. If one of roots of $2x^2 - ax + 32 = 0$ is twice the other root, then the value of a is ____

A. $-2\sqrt{2}$

B. $8\sqrt{2}$

C. $12\sqrt{2}$

D. $-2\sqrt{2}$

Answer: C



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7. Determine the value of k for which the quadratic equation $2x^2 + 3x + k = 0$ has real roots.

A. $k \leq \frac{9}{8}$

B. $k \geq \frac{9}{8}$

C. $k = \frac{8}{9}$

D. $k < \frac{8}{9}$

Answer: A



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8. Roots of the quadratic equation

$x^2 + x - (a + 1)(a + 2) = 0$ are ____

A. $-(a + 1), (a + 2)$

B. $(a + 1), -(a + 2)$

C. $(a + 1), (a + 2)$

D. $-(a + 1), -(a + 2)$

Answer: B



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9. The roots of the equation $3\sqrt{x} + 5(x)^{-\frac{1}{2}} = \sqrt{2}$ can be found by solving_____

A. $9x^2 + 28x + 25 = 0$

B. $9x^2 + 30x + 25 = 0$

C. $9x^2 + 28x - 25 = 0$

D. $16x^2 + 22x - 30 = 0$

Answer: A



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10. The roots of the quadratic equation

$$\frac{x^2 - 8}{x^2 + 20} = \frac{1}{2} \text{ are}$$

A. ± 3

B. ± 2

C. ± 6

D. ± 4

Answer: C



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11. Two numbers whose sum is 12 and the absolute value of whose difference is 4 are the roots of the equation ____

A. $x^2 - 12x + 30 = 0$

B. $x^2 - 12x + 32 = 0$

C. $2x^2 - 6x + 7 = 0$

D. $2x^2 - 24x + 43 = 0$

Answer: B



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12. The roots of the equation

$$x^{\frac{2}{3}} + x^{\frac{1}{3}} - 2 = 0 \text{ are}$$

A. $1, -8$

B. $1, -2$

C. $\frac{2}{3}, \frac{1}{3}$

D. $-2, -8$

Answer: A



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13. If the roots of the equation

$$\frac{x(x - 1) - (m + 1)}{(x - 1)(m - 1)} = \frac{x}{m} \text{ are equal, then}$$

what is the value of m ?

A. $\frac{1}{2}$

B. $-\frac{1}{2}$

C. 0

D.1

Answer: B



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Everyday Mathematics

1. In a bangle shop, the shopkeeper displays the bangles in the form of a square then he is left with 38 bangles with him. If he wanted to increase the size of square by one unit each

side of the square he found that 25 bangles fall short of in completing the square. The actual number of bangles which he had with him in the shop was :

A. 1690

B. 999

C. 538

D. Can't be determined

Answer: B



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2. In the Maths two representatives, while solving a quadratic equation, committed the following mistakes :

(i) One of them made a mistake in the constant term and got the roots as 5 and 9.

(ii) Another of x and got the roots as 12 and 4.

But in the meantime, they realised that they are wrong and they managed to get it right jointly. Find the correct quadratic equation.

$$A. x^2 + 4x + 14 = 0$$

B. $2x^2 + 7x - 24 = 0$

C. $x^2 - 14x + 48 = 0$

D. $3x^2 - 17x + 52 = 0$

Answer: C



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3. ₹ 6,500 were divided equally among a certain number of persons. Had there been 15 more persons, each would have got ₹ 30 less.

Find the original number of persons?

A. 50

B. 60

C. 45

D. 55

Answer: A



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4. Swati can row her boat at a speed of 5 km/hr in still water. If it takes her 1 hour more to row the boat 5.25 km upstream than to

return downstream, find the speed of the stream.

A. 5km/hr

B. 2 km/hr

C. 3 km/hr

D. 4 km/hr

Answer: B



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1. Which of the following equations has two distinct real roots?

A. $2x^2 - 3\sqrt{2}x + \frac{9}{4} = 0$

B. $x^2 + x - 5 = 0$

C. $x^2 + 3x + 2\sqrt{2} = 0$

D. $5x^2 - 3x + 1 = 0$

Answer: B



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2. Read the statement carefully and state 'T' for true and 'F' for false.

(i) The value of $2 + \frac{1}{2 + \frac{1}{2 + \dots \infty}}$ is $\sqrt{2}$

(ii) A line segment AB of length 2 m is divided at C into two parts such that $AC^2 = AB \cdot CB$. The length of the part CB is $3 + \sqrt{5}$.

(iii) Every quadratic equation can have at most two real roots.

(iv) A real number α is said to be a root of the quadratic equation $ax^2 + bx + c = 0$, if $a\alpha^2 + b\alpha + c = 0$

A. i ii iii iv
 F T T T

B. i ii iii iv
 F T T F

C. i ii iii iv
 T F F T

D. i ii iii iv
 F F T T

Answer: A



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3. The denominator of a fraction is one more than twice the numerator. If the sum of the

fraction and its reciprocal is $2\frac{16}{21}$, find the fraction.

A. $\frac{3}{7}$

B. $\frac{7}{3}$

C. $\frac{4}{3}$

D. $\frac{3}{4}$

Answer: A



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