Quadratic Equation Questions for RRB Group-D PDF

Instructions

For the following questions answer them individually

Question 1

Which of the following quadratic equations has real roots?

A $4x^2 - 3x + 6 = 0$

B $2x^2 + 7x + 6 = 0$

C $x^2 - 2x + 4 = 0$

D $3x^2 - 4x + 3 = 0$

Answer: B

Explanation:

A quadratic equation : $ax^2 + bx + c = 0$ has real roots iff Discriminant, $D = b^2 - 4ac \geq 0$

(A) : $4x^2 - 3x + 6 = 0$

=> D = $(-3)^2 - 4(4)(6) = 9 - 96 = -87$

(B) : $2x^2 + 7x + 6 = 0$

=> D = $(7)^2 - 4(2)(6) = 49 - 48 = 1$

(C) : $x^2 - 2x + 4 = 0$

=> D = $(-2)^2 - 4(1)(4) = 4 - 16 = -12$

(D) : $3x^2 - 4x + 3 = 0$

=> D = $(-4)^2 - 4(3)(3) = 16 - 36 = -20$

Thus, the equation : $2x^2 + 7x + 6 = 0$ has real roots.

Question 2

What is the value of m in the quadratic equation $x^2 + mx + 24 = 0$ if one of its roots is $\frac{3}{2}$

A $-\frac{45}{2}$

B 16

C $-\frac{21}{2}$

D $-\frac{35}{2}$

Answer: D

Explanation:

Putting $x = \frac{3}{2}$ in the quadratic equation : $x^2 + mx + 24 = 0$

=> $(\frac{3}{2})^2 + m(\frac{3}{2}) + 24 = 0$

=> $\frac{9}{4} + 24 + \frac{3m}{2} = 0$

=> $\frac{3m}{2} = -(\frac{96+9}{4})$

=> $m = \frac{-105}{4} \times \frac{2}{3}$

=> $m = \frac{-35}{2}$

=> Ans - (D)

Question 3

What are the roots of the quadratic equation: $x^2 + 3x - 154 = 0$

A 21, 14

B 11, -14

C 14, -11

D 14, 22

Answer: B

Explanation:

Equation : $x^2 + 3x - 154 = 0$

=> $x^2 + 14x - 11x - 154 = 0$

=> $x(x + 14) - 11(x + 14) = 0$

=> $(x + 14)(x - 11) = 0$

=> $x = -14, 11$

=> Ans - (B)

Question 4

What are the roots of the quadratic equation $21x^2 - 37x - 28 = 0$ **?**

A $\frac{-7}{3}, \frac{4}{7}$

B $\frac{3}{7}, \frac{-7}{4}$

C $\frac{7}{3}, \frac{-4}{7}$

D $\frac{-3}{7}, \frac{7}{4}$

Answer: C

Explanation:

Equation : $21x^2 - 37x - 28 = 0$

=> $21x^2 - 49x + 12x - 28 = 0$

=> $7x(3x - 7) + 4(3x - 7) = 0$

=> $(7x + 4)(3x - 7) = 0$

=> $x = \frac{-4}{7}, \frac{7}{3}$

=> Ans - (C)

Question 5

Which of the following quadratic equations has real roots?

A $4x^2 - 9x + 6 = 0$

B $3x^2 - 2x + 6 = 0$

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

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

Answer: C

Explanation:

A quadratic equation : $ax^2 + bx + c = 0$ has real roots iff Discriminant, $D = b^2 - 4ac \geq 0$

(A) : $4x^2 - 9x + 6 = 0$

=> D = $(-9)^2 - 4(4)(6) = 81 - 96 = -15$

(B) : $3x^2 - 2x + 6 = 0$

=> D = $(-2)^2 - 4(3)(6) = 4 - 72 = -68$

(C) : $2x^2 - 7x + 6 = 0$

=> D = $(-7)^2 - 4(2)(6) = 49 - 48 = 1$

(D) : $x^2 - 2x + 2 = 0$

=> D = $(-2)^2 - 4(1)(2) = 4 - 8 = -4$

Thus, the equation : $2x^2 - 7x + 6 = 0$ has real roots.

Question 6

What are the roots of the quadratic equation $4x^2 + 6x - 18 = 0$?

A 3, -3

B 3, 6

C 3/2, -3

D 3, 3

Answer: C

Explanation:

Expression : $4x^2 + 6x - 18 = 0$

=> $4x^2 - 6x + 12x - 18 = 0$

=> $2x(2x - 3) + 6(2x - 3) = 0$

=> $(2x + 6)(2x - 3) = 0$

=> $x = \frac{3}{2}, -3$

=> Ans - (C)

Question 7

Which of the following quadratic equations has real roots?

A $3x^2 - 5x + 2 = 0$

B $3x^2 - 4x + 2 = 0$

C $4x^2 - 3x + 2 = 0$

D $5x^2 - 2x + 2 = 0$

Answer: A

Explanation:

A quadratic equation : $ax^2 + bx + c = 0$ has real roots iff Discriminant, $D = b^2 - 4ac \geq 0$

(A) : $3x^2 - 5x + 2 = 0$

=> D = $(-5)^2 - 4(3)(2) = 25 - 24 = 1$

(B) : $3x^2 - 4x + 2 = 0$

=> D = $(-4)^2 - 4(3)(2) = 16 - 24 = -8$

(C) : $4x^2 - 3x + 2 = 0$

=> D = $(-3)^2 - 4(4)(2) = 9 - 32 = -23$

(D) : $5x^2 - 2x + 2 = 0$

=> D = $(-2)^2 - 4(5)(2) = 4 - 40 = -36$

Thus, the equation : $3x^2 - 5x + 2 = 0$ has real roots.

Question 8

Find the roots of the quadratic equation : $27x^2 + 57x - 14 = 0$

A 2/9, 7/3

B 2/9, -7/3

C 9/2, 3/7

D 9/2, 3/7

Answer: B

Explanation:

Expression : $27x^2 + 57x - 14 = 0$

=> $27x^2 - 6x + 63x - 14 = 0$

=> $3x(9x - 2) + 7(9x - 2) = 0$

=> $(3x + 7)(9x - 2) = 0$

=> $x = \frac{2}{9}, \frac{-7}{3}$

Question 9

Which of the following is not a quadratic equation?

A $3x(x + 5) - 11 = 2x(x - 2) + 6$

B $4x(x + 3) + 7 = 4x(x - 11) + 9$

C $x(x + 2) - 15 = x(2x - 5) + 11$

D $4x^2 - 6x - 9 = 0$

Answer: B

Explanation:

(A) : $3x(x + 5) - 11 = 2x(x - 2) + 6$

=> $3x^2 + 15x - 11 = 2x^2 - 4x + 6$

=> $x^2 + 19x - 17 = 0$

(B) : $4x(x + 3) + 7 = 4x(x - 11) + 9$

=> $4x^2 + 12x + 7 = 4x^2 - 44x + 9$

=> $56x - 2 = 0$

(C) : $x(x + 2) - 15 = x(2x - 5) + 11$

=> $x^2 + 2x - 15 = 2x^2 - 5x + 11$

=> $x^2 - 7x + 26 = 0$

(D) : $4x^2 - 6x - 9 = 0$

∴ Option (B) is not a quadratic equation.

Question 10

Find the difference of the roots of the equation $x^2 - 8x + 13 = 0$

A 2

B 4

C $2\sqrt{3}$

D $4\sqrt{3}$

Answer: C

Explanation:
let a and b be the roots.
a+b = 8
ab = 13
a-b = $\sqrt{(a+b)^2 - 4ab}$
= $\sqrt{8^2 - 4 * 13}$
= $\sqrt{12}$
= $2\sqrt{3}$