**JNV**

**MODEL QUESTIONS**

**MATHEMATICS: 4 QUADRATIC EQ**

**Class : X**

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| 1 | For what value of k, are the roots of the quadratic equation 3x2 + 2kx + 27 = 0 real and equal. |  |
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|  | ANS:     D = b2 – 4ac C:\fake\image1.pngD = (2k)2 – 4 × 3 × 27 = 4k2 – 324 For real and equal roots, D = 0 C:\fake\image2.png4k2 – 324 = 0 C:\fake\image3.png4k2 = 324 C:\fake\image4.pngk2 = C:\fake\image5.pngC:\fake\image6.pngk2 = 81 C:\fake\image7.pngk = ± 9. |  |
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| 2 | Write the nature of roots of the quadratic equation 9x2 – 6x – 2 = 0. |  |
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|  | ANS:     Given quadratic equation is 9x2 – 6x – 2 = 0 Here a = 9, b = –6, c = –2 D = b2 – 4ac C:\fake\image8.pngD = (–6)2 – 4 × 9 × (– 2) = 36 + 72 = 108 > 0 C:\fake\image9.png  Given quadratic has two unequal real roots. |  |
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| 3 | The roots of ax2 + bx + c = 0, a ≠ 0 are real and unequal. What is value of D? |  |
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|  | ANS:     For unequal and real roots, D > 0 |  |
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| 4 | If ax2 + bx + c = 0 has equal roots, what is the value of c? |  |
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|  | ANS:     Since the quadratic equation has equal roots, then b2 – 4ac = 0 C:\fake\image10.png4ac = b2 C:\fake\image11.pngc = C:\fake\image12.png |  |
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| 5 | If 2 is a root of the equation x2 + bx + 12 = 0, find the value of b. |  |
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|  | ANS:     Since 2 is a root of the given equation. C:\fake\image13.png  (2)2 + b(2) + 12 = 0 C:\fake\image14.png16 + 2b = 0 C:\fake\image15.pngb = – 8 |  |
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| 6 | For what value of k does (k – 12)x2 + 2(k – 12)x + 2 = 0 have equal roots? |  |
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|  | ANS:     D = [2(k – 12)]2 – 4(k – 12) × 2 = 4(k – 12)2 – 8(k – 12) For equal and real roots, D = 0 C:\fake\image16.png4(k – 12)2 – 8(k – 12) = 0 C:\fake\image17.png4(k – 12) (k – 12 – 2) = 0 C:\fake\image18.png4(k – 12) (k – 14) = 0 C:\fake\image19.pngk = 12 or k = 14 C:\fake\image20.png  a ≠ 0 C:\fake\image21.pngk ≠ 12; C:\fake\image22.pngk = 14. |  |
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| 7 | Solve the following quadratic equation by factorisation: 12abx2 – (9a2 – 8b2)x – 6ab = 0 |  |
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|  | ANS:     12abx2 – (9a2 – 8b2)x – 6ab = 0 C:\fake\image23.png12abx2 – 9a2x + 8b2x – 6ab = 0 C:\fake\image24.png3ax(4bx – 3a) + 2b(4bx – 3a) = 0 C:\fake\image25.png(4bx – 3a) (3ax + 2b) = 0 C:\fake\image26.png4bx – 3a = 0 or 3ax + 2b = 0  C:\fake\image27.pngx = **C:\fake\image28.png** |  |
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| 8 | Solve the following equation by the method of completing the square: 2x2 + 4x – 16 = 0 |  |
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|  | ANS:     Given equation is 2x2 + 4x – 16 = 0 C:\fake\image29.png2(x2 + 2x – 8) = 0 C:\fake\image30.pngx2 + 2x – 8 = 0 C:\fake\image31.pngx2 + 2x + 1 – 1 – 8 = 0 C:\fake\image32.png(x + 1)2 – 9 = 0 C:\fake\image33.png(x + 1)2 = 9 C:\fake\image34.png(x + 1) = ± C:\fake\image35.png C:\fake\image36.pngx + 1 = 3 or x + 1 = –3 C:\fake\image37.pngx = 2 or x = –4 |  |
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| 9 | Solve the following equation by using quadratic formula: 9x2 – 12x + 4 = 0. |  |
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|  | ANS:     Given equation is 9x2 – 12x + 4 = 0 Here a = 9, b = – 12, c = 4 D = b2 – 4 a c C:\fake\image38.pngD = (–12)2 – 4 × 9 × 4 C:\fake\image39.pngD = 144 – 144 = 0 D = 0 C:\fake\image40.png  Equation has equal roots given by x = – C:\fake\image41.png C:\fake\image42.pngx =  C:\fake\image43.png   C:\fake\image44.png   x = C:\fake\image45.pngis the required solution. |  |
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| 10 | If a and b are roots of the equation 2x2 + 7x + 5 = 0 then write a quadratic equation whose roots are 2a + 3 and 2b + 3. |  |
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|  | ANS:     Here given quadratic equation is 2x2 + 7x + 5 = 0 C:\fake\image46.pnga and b are roots C:\fake\image47.png a + b = C:\fake\image48.png...(i) and a ⋅ b = C:\fake\image49.png...(ii) Now, quadratic equation whose roots are 2a + 3 and 2b + 3 is x2 – [2a + 3 + 2b + 3]x + (2a + 3) (2b + 3) = 0 C:\fake\image50.pngx2 – [2(a + b) + 6]x + (4ab + 6(a + b) + 9] = 0 C:\fake\image51.pngx2 – 2C:\fake\image52.png [using eq. (i) and (ii)] C:\fake\image53.pngx2+ x – 2 = 0 |  |
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| 11 | Solve for x : C:\fake\image54.png, x ≠ 1, x ≠ – 1. |  |
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|  | ANS:     We have C:\fake\image55.png C:\fake\image56.png  C:\fake\image57.png C:\fake\image58.png  C:\fake\image59.png C:\fake\image60.pngC:\fake\image61.png C:\fake\image62.png24x = 5x2 – 5 C:\fake\image63.png5x2 – 24x – 5 = 0 C:\fake\image64.png5x2 – 25x + x – 5 = 0 C:\fake\image65.png(5x + 1)(x – 5) = 0 C:\fake\image66.pngx = – C:\fake\image67.png, 5. |  |
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| 12 | A takes 6 days less than the time taken by B to finish a piece of work. If both A and B together can finish it in 4 days, find the time taken by B to finish the work. |  |
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|  | ANS:     Let number of days taken by B to finish a work = x Number of days taken by A to finish a work = (x – 6) Number of days taken by A and B together = 4 Now A’s one day work + B’s one day work = one day’s work of A and B together C:\fake\image68.pngC:\fake\image69.pngC:\fake\image70.pngC:\fake\image71.png C:\fake\image72.png8x – 24 = x2 – 6x C:\fake\image73.pngx2 – 14x + 24 = 0 C:\fake\image74.png(x – 12)(x – 2) = 0 C:\fake\image75.pngx = 12, x = 2 (not possible) C:\fake\image76.png  Number of days taken by B to finish the work = 12 |  |
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