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India's Number 1 Education App

MATHS

BOOKS - DEEPTI MATHS (TELUGU ENGLISH)

THEORY OF EQUATIONS

Solved Examples

1. The equation of lowest degree with rational coeficients having a root $\sqrt{3}+\sqrt{2}i$ is

A. $x^4-2x^2+25=0$

B. $x^4+3x+15=0$

C. $x^5+5x+50=0$

D. $x^3+3x+13=0$

Answer: 1

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2. If α, β, γ are the roots of $x^3 + x^2 + x + 1 = 0$ then $\alpha^2 + \beta^2 + \gamma^2$ =

A. 1

B. -1

C. 2

D. -2

Answer: 2

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3. The sum of the fifth powers of the roots of the equation $x^4 - 7x^2 + 4x - 3 = 0$ is

A. 99

B. -140

C. -99

D. 140

Answer: 2

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4. One roots of $x^3 - 7x + 7 = 0$ lies between

A. 1,2

B. $-4, \ -3$

C. 4,4

D. 2, -4

Answer: 2

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5. If α, β, γ are the roots of $x^3 + 3x + 2 = 0$ then the equation whose roots $\alpha(\beta + \gamma), \beta(\gamma + \alpha), \gamma(\alpha + \beta)$ is

A. $x^3 + 6x^2 + 9x + 4 = 0$

B. $x^3 - 6x^2 + 9x + 4 = 0$

C. $x^3 + 6x^2 - 9x + 4 = 0$

D. $x^3 - 6x^2 - 9x - 4 = 0$

Answer: 2

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6. If α, β, γ are the roots of the equation $x^3 + 3x^2 + 8x - 2 = 0$ then the value of $(4 + \alpha^2)(4 + \beta^2)(4 + \gamma^2)$=

A. 120

B. 230

C. 260

D. 240

Answer: 3

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Exercise 1 A

1. The quotient we get when we divide $x^3 - 3x^2 - x + 3$ with (x + 1) is

A. $x^2 - 3x + 4$

B. $x^2 + 3x + 4$

C. $x^2 - 4x + 3$

D. $x^2 + 4x + 3$

Answer: 3

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2. The quotient we get when we divide $x^4 - 8x^3 + 25x^2 - 46x + 40$ with $x^2 - 6x + 8$ is

A. $x^2 + 5x - 2$

B. $x^2 + 5x + 2$

C. $x^2 + 2x - 5$

D. $x^2 - 2x + 5$

Answer: 4

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3. The remainder when $2x^5 - 3x^4 + 5x^3 - 7x^2 + 3x - 4$ is divided by x - 2 is

A. 10

B. 20

C. 30

D. 40

Answer: 3

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4. The remainder we get when we divide $2x^5 - 3x^4 + 5x^3 - 3x^2 + 7x - 9$ with $x^2 - x - 3$ is

A. 33x + 4

B. 41x + 3

C. 41x + 44

D. 33x - 4

Answer: 2

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5. The value of k so that $3x^4 + 4x^3 + 2x^2 + 10x + k$ is divisible by x + 2 is

A. 2

B. -2

C. 4

D. -4

Answer: 4

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6. The value of b so that $x^4 - 3x^3 + 5x^2 - 33x + b$ is divisible by $x^2 - 5x + 6$ is

A. 45

B. 48

C. 51

D. 54

Answer: 4

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7. If f(x) = $2x^4 - 13x^2 + ax + b$ is divisible by $x^2 - 3x + 2$, then (a,b) =

A. (-9,-2)

B. (6,4)

C. (9,2)

D. (2,9)

Answer: 3

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8. If f(x) = $2x^4 + 5x^3 - 7x^2 - 4x + 3$ then f(x -1) =

A. $2x^4 + 3x^3 + 10x^2 + 17x + 3$

B. $2x^4 - 3x^3 + 10x^2 + 17x - 3$

C. $2x^4 - 3x^3 - 10x^2 + 17x - 3$

D. $2x^4 + 3x^3 - 10x^2 - 17x + 3$

Answer: 3

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9. If f(x) = $x^4 - 12x^3 + 17x^2 - 9x + 7$ then f(x + 3) =

A. $x^4 - 37x^2 - 123x + 110$

B. $x^4 - 25x^2 - 73x - 85$

C. $x^4 - 13x^3 - 12x^2 - 15$

D. $x^4 - 47x^2 - 125x + 165$

Answer: 1

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10. The equation whose roots are 2, -3, 5 is

A. $x^3 - 4x^2 - 11x + 30 = 0$

B. $x^2 + 2y^2 - 11x + 3 = 0$

C. $2x^3 - 3x^2 - 21x + 60 = 0$

D. $2x^3 + 5x^2 - 21x + 6 = 0$

Answer: 1

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11. The equation whose roots are - 2, $3 \pm \sqrt{5}$ is

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

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

C. $x^3 - 4x^2 - 8x + 8 = 0$

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

Answer: 3

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12. The equation whose roots are 1, 2 $\pm$ 3i is

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

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

C. $x^3 - 4x^2 - 8x + 8 = 0$

D. $x^3 - 5x^2 + 17x - 13 = 0$

Answer: 4

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13. The equation whose roots are $1 + \sqrt{3}, 1 - \sqrt{3}, 2, 5$ is

A. $x^4 - 9x^3 + 22x^2 - 6x - 20 = 0$

B. $x^4 + 9x^3 + 22x^2 - 6x + 20 = 0$

C. $x^4 - 9x^3 - 22x^2 + 6x - 20 = 0$

D. $x^4 - 9x^3 + 22^2 - 6x + 20 = 0$

Answer: 1

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14. The equation whose roots are $1 \pm \sqrt{2}, 2 \pm \sqrt{3}$ is

A. $x^4 - 5x^2 + 4 = 0$

B. $x^4 - 9x^3 + 27x^2 - 33x + 14 = 0$

C. $x^4 - 6x^3 + 8x^2 + 2x - 1 = 0$

D. $x^4 - 6x^3 + 4x^2 + 5x - 117 = 0$

Answer: 3

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15. From the polynomial equation whose roots are 1+I,1-I,1+I,1-I

A. $x^4 + 4 = 0$

B. $x^4 - 4 = 0$

C. $x^2 + 2 = 0$

D. $x^2 - 2 = 0$

Answer: 1

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16. The equation whose roots are $3 \pm \sqrt{2}, 2 \pm 3i$ is

A. $x^4 - 6x^3 + 8x^2 + 2x - 1 = 0$

B. $x^4 - 9x^3 + 27x^2 - 33x + 14 = 0$

C. $x^4 - 10x^3 + 44x^2 - 106x + 91 = 0$

D. $x^4 - 6x^3 + 4x^2 + 54x - 117 = 0$

Answer: 3

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17. The euqation whose roots are a + b, a - b , - a + b, -a -b is

A. $6x^4 - 13x^2 - 12x^2 + 39x - 18 = 0$

B. $x^4 - 2(a^2 + b^2)x^2 + (a^2 - b^2)^2 = 0$

C. $x^6 + 2x^5 - 11x^4 - 12x^3 + 36x^2 = 0$

D. $x^6 - 5x^5 - 8x^4 + 40x^3 + 16x^2 - 80x = 0$

Answer: 2

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18. The biquadratic equation having roots $4 \pm \sqrt{3}, 2 \pm i$ is

A. $x^4 - 12x^3 + 50x^2 - 92x + 65 = 0$

B. $x^4 + 12x^3 + 50x^2 - 92x + 65 = 0$

C. $x^4 + 12x^3 - 50x^2 + 92x + 65 = 0$

D. $x^4 - 12x^3 - 50x^2 + 92x + 65 = 0$

Answer: 1

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19. The biquadratic equation having roots 2 + 3i, 1 + i is

A. $x^4 - 6x^3 + 23x^2 - 34x + 26 = 0$

B. $x^4 - 7x^3 + 18x^2 - 22x + 12 = 0$

C. $x^4 - 6x^3 + 12x^2 - 18x - 5 = 0$

D. $x^4 - 4x^3 + 8x^2 - 8x + 4 = 0$

Answer: 1

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20. The biquadratic equation with rational coefficients having roots 2 + $\sqrt{3}$, 3+ 4i is

A. $x^4 + 10x^3 + 50x^2 + 106x + 25 = 0$

B. $x^4 + 10x^3 - 50x^2 - 106x + 25 = 0$

C. $x^4 - 10x^3 + 50x^2 - 106x + 25 = 0$

D. $x^4 - 10^3 - 50x^2 + 106x - 25 = 0$

Answer: 3

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21. The biquadratic equation, two of whose roots are 1 + i , 1 - $\sqrt{2}$ is

A. $x^4 - 4x^3 + 5x^2 - 2x - 2 = 0$

B. $x^4 - 4x^3 - 5x^2 + 2x + 2 = 0$

C. $x^4 + 4x^3 - 5x^2 + 2x - 2 = 0$

D. $x^4 + 4x^3 + 5x^2 - 2x + 2 = 0$

Answer: 1

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22. The equation whose roots are , 0, 0, 2,2,-3,-3 is

A. $6x^4 - 13x^2 - 12x^2 + 39x - 18 = 0$

B. $x^4 - 2(a^2 + b^2)x^2 + (a^2 - b^2)^2 = 0$

C. $x^6 + 2x^5 - 11x^4 - 12x^3 + 36x^2 = 0$

D. $x^6 - 5x^5 - 8x^4 + 40x^3 + 16x^2 - 80x = 0$

Answer: 3

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23. The equaiton of lowest degree with rational coefficients having a roots $\sqrt{3}+\sqrt{2}$ is

A. $x^4+10x^2-1=0$

B. $x^4-10x^2+1=0$

C. $x^4+10x^2+1=0$

D. $x^4-10x^2-1=0$

Answer: 2

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24. The equation of lowest degree with rational coeficients having a root - $\sqrt{2}-\sqrt{2i}$ is

A. $x^4+2x^2+25=0$

B. $x^4+16=0$

C. $x^4-8x^2+36=0$

D. $x^8 - 16x^6 + 88x^4 + 19x^2 + 144 = 0$

Answer: 2

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25. The equation of lowest degree with rational coeficients having a roots $\sqrt{2} + \sqrt{3} + i$ is

A. $x^4 + 2x^2 + 25 = 0$

B. $x^4 + 16 = 0$

C. $x^4 - 8x^2 + 36 = 0$

D. $x^8 - 16x^6 + 88x^4 + 19x^2 + 144 = 0$

Answer: 4

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26. If (x) is a polynomal of degree n with rational coeficients and 1 + $2i, 2-\sqrt{3}$ and 5 are three roots of f(x) = 0 , then the least value of n is

A. 5

B. 4

C. 3

D. 6

Answer: 1

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27. If 1,2,3 and 4 are the roots of the eqaution $x^4 + ax^3 + bx^2 + cx + d = 0,$ then a + 2b + c =

A. -25

B. 0

C. 10

D. 24

Answer: 3

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28. The roots of $x^3 + 2x^2 - x - 2 = 0$ are

A. 0,0,2

B. 0,1,2

C. $-2, \ -1, 1$

D. 1, $\pm$ i

Answer: 3

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29. The roots of $x^3 + x^2 - 2x - 2 = 0$ are

A. $-1, \pm\sqrt{2}$

B. 0,1,2

C. $-2, -1, 1$

D. $1, \pm i$

Answer: 1

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30. Thr roots of the equation $x^3 - 3x - 2 = 0$ are

A. $-1, -1, 2$

B. $-1, 1, -2$

C. $-1, 2, -3$

D. $-1, -1, -2,$

Answer: 1

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31. The roots of $x^4 - 1 = 0$ are

A. 0,0, $\pm$ 1

B. $\pm 1, \ \pm i$

C. $\pm \sqrt{2}, \ \pm i$

D. $\pm \sqrt{2}, \ \pm \sqrt{3}$

Answer: 2

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32. The roots of $x^4 - 5x^3 + 3x^2 + 19x - 30 = 0$ are

A. $-2, 3, 3 \pm$ i

B. $-2, 3, 2, \ \pm i$

C. $-2, 3, 2 \pm i$

D. $-2, 3, 2 \pm i$

Answer: 3

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33. Given that 2 is a root of $x^3 - 6x^2 + 3x + 10 = 0$, find the other roots .

A. 5,1

B. $-5, 1$

C. $5, \ -1$

D. $-5, \ -1$

Answer: 3

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34. If 2 is a root of $x^3 + 3x^2 - 4x + k = 0$ then the roots are

A. 2,3, - 3

B. 2, - 2, 3

C. -2, 3, -3

D. 2, -2, -3

Answer: 4

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35. The roots of $x^4 + 4x^3 + 5x^2 + 2x - 2 = 0$ one root being -1 + i are

A. $1 + i$, - 1 + i, -1 - $\sqrt{2}$, $1 + \sqrt{2}$

B. $-1 +$ i, -1 -i, -2 - $\sqrt{2}$, $-1 + \sqrt{2}$

C. -1, $-i$, 1 - i, -1 + $\sqrt{2}$, $-1 + \sqrt{2}$

D. $1 + i$, -1 + i, 1 + $\sqrt{2}$, $-1 + \sqrt{2}$

Answer: 2

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36. The roots of $3x^3 - 4x^2 + x + 88 = 0$, one root being $2 + \sqrt{7}i$ are

A. $-\frac{8}{3}, 2 + \sqrt{7}i, 2 - \sqrt{7}i$

B. $2i, 2 + \sqrt{7}i, 2 - \sqrt{7}i$

C. $-1, 1 + 2i, 1 - 2i$

D. $-1, 1 + \sqrt{2}i, 1 + \sqrt{2}i$,1 - 2i

Answer: 1

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37. The root of $x^3 - 6x^2 + 7x + 2 = 0$ one root being $2 + \sqrt{5}$ are

A. $-8/3, 2 + \sqrt{7}i, 2 - \sqrt{7}$

B. $2, 2+\sqrt{5}, 2-\sqrt{5}$

C. $-1, 1+2, 1-2$

D. $-1+\sqrt{2}, 1+\sqrt{2}, 1-1$

Answer: 2

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38. If $3-\sqrt{2}$ is a root of $x^4-8x^3+21x^2-26x+14=0$ then the roots are

A. $1 \pm \sqrt{2}, 1 \pm i$

B. $-1 \pm \sqrt{2}, \ -1 \pm i$

C. $3 \pm \sqrt{2}, 1 \pm i$

D. $-3 \pm \sqrt{2}, \ -1 \pm i$

Answer: 3

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39. If 2, 3 are the roots of the equation $2x^3 + px^2 - 13x + q = 0,$ then (p , q) =

A. (-5, - 30)

B. (-5, 30)

C. (5, -30)

D. (5, 30)

Answer: 2

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40. If - 1 + i is a root of $x^4 + 4x^3 + 5x^2 + 2x + k = 0$ then k =

A. 1

B. -1

C. 2

D. -2

Answer: 4

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41. If two roots of $x^4 - 16x^3 + 86x^2 - 176x + 105 = 0$ are 1, 7 then the roots are

A. $-11/2, 3/5, 1, 7$

B. 1,7,3,5

C. 3,-5,1,7,

D. 1,7,$\sqrt{2}, \sqrt{5}$

Answer: 2

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42. If one of the root $x^4 - 5x^3 + 10x^2 - 20x + 24 = 0$ is purely imaginary then the roots are

A. 1, -2, 4, - 8

B. $\pm$ 1, 2, 3

C. $\pm$ 2i,2,3

D. $-3/2$, - 1/3, $2 \pm \sqrt{3}$

Answer: 3

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43. It two roots of $20x^3 - 16x^2 + x + 1 = 0$ are equal then the roots are

A. 1/2, 1/2, -1/5

B. $-1/2, 1/3, 1/5$

C. $1/2, 1/2, -6$

D. $-2, 1/2, 3$

Answer: 1

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44. The roots of $x^3 - 3x^2 + 4 = 0$, when there is a multiple root, are

A. $1/2, 1, -3$

B. $1/3, 1/3, 1$

C. $6, 4, -1$

D. $2, 2, -1$

Answer: 4

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45. If $x^4 - 5x^3 + 9x^2 - 7x + 2 = 0$ has a multiple roots of order 3 then the roots are

A. 1,1,1,2

B. 1,2,2,2

C. -1, -1,-1,2

D. 1, -2, -2, -2,

Answer: 1

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46. Find the repeated roots of $x^5 - 3x^4 - 5x^3 + 27x^2 - 32x + 12 = 0$

A. 1,2

B. $-1, 2$

C. 2, 3

D. $-2, 3$

Answer: 1

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47. The multiple roots of $x^4 - 2x^3 - 11x^2 + 12x + 36 = 0$ are

A. 1, 2

B. $-1,\ 2$

C. 2, 3

D. $-2, 3$

Answer: 4

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48. If the roots of $x^4 - 6x^3 + 13x^2 - 12x + 4 = 0$ are $\alpha, \alpha, \beta, \beta$then the value of α, β are

A. 2, 1

B. $-2,\ -1$

C. $3, 1$

D. $-3,$ -1

Answer: 1

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49. If $x^4 + 4x^3 - 2x^2 - 12x + 9 = 0$ has a pair of equal roots then the roots are

A. $-1, -1, 2, 2$

B. $1, 1, -2, -2$

C. $-1, -1, 3, 3$

D. $1, 1, -3, -3,$

Answer: 4

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50. The there is a multiple root of order 3 for the equation $x^4 - 2x^3 + 2x - a = 0$, then the other root is

A. -1

B. 0

C. 1

D. 2

Answer: 1

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51. If one root of $24x^3 - 14x^2 - 63x + 45 = 0$ is the double the other then the roots are

A. $-1, 1/2, 2$

B. 2, 2, - 1

C. 3/4, 3/2 , -5/3

D. $-3/2,\ -3/4, 1/3$

Answer: 3

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52. If one root of $24x^3 + 46x^2 + 9x - 9 = 0$ is the double the other then the roots are

A. $-1, 1/2, 1$

B. 2, 2, - 1

C. 3/4, 3/2 , -5/3

D. $-3/2,\ -3/4, 1/3$

Answer: 4

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53. If two roots of $x^3 - 4x^2 + x + 6 = 0$ are in the ratio 2 : 3 then the roots are

A. 2, 3, - 1

B. $-3/2, \ -2, 4$

C. $-1, 1/2, 2$

D. 2, 2, -1

Answer: 1

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54. If two roots of $2x^3 - x^2 - 22x - 24 = 0$ are in the ratio 3 : 4 then the roots are

A. 2, 3, - 1

B. $-3/2, \ -2, 4$

C. $-1, 1/2, 2$

D. 2, 2, -1

Answer: 2

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55. If the sum of two of the roots of $4x^3 + 16x^2 - 9x - 36 = 0$ is zero then the roots are

A. $\pm\sqrt{5}, 1 + i$

B. $\frac{3}{2}, -\frac{3}{2}, -4$

C. $-\frac{1}{2}, \frac{1}{2}, -\frac{1}{5}$

D. $\pm\sqrt{2}, \sqrt{5}$

Answer: 2

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56. If the sum of two of the roots of $x^4 - 2x^3 - 3x^2 + 10x - 10 = 0$ is zero then the roots are

A. $\pm\sqrt{5}, 1 \pm i$

B. $\pm\sqrt{5}, 1, -1$

C. $1/2, -1/5, \pm 1$

D. $\sqrt{2}, \sqrt{5}, \pm 2$

Answer: 1

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57. If two of the roots of $8x^4 - 2x^3 - 27x^2 + 6x + 9 = 0$ are being equal in magnitude but opposite in sign then the roots are

A. 2/3, -1/2, 1, 2

B. 1, $\pm$ 2, -3

C. $\pm\sqrt{3}$, 3/4, -1/2

D. -4, -1, 2,5

Answer: 3

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58. If the roots of $2x^3 - 3x^2 - 11x + 6 = 0$ are in A.P. then the roots are

A. 1/2, 1/2, -1/5

B. $-1/2, 1/3, 1/5$

C. 1/2, 1/2, -6

D. -2 1/2 ,3

Answer: 4

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59. If the roots of $x^4 - 8x^3 + 14x^2 + 8x - 15 = 0$ are in A.P then the roots are

A. $-1, 1, 3, 5$

B. 1,1, -3, -5

C. 1/2, 1/2, -6

D. -2 1/2 ,3

Answer: 1

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60. If the roots of $x^4 - 2x^3 - 21x^2 + 22x + 40 = 0$ are in A.P. then the roots are

A. 2/3, -1/2, 1, 2

B. 1, $\pm$ 2, -3

C. $\pm\sqrt{3}$, 3/4, -1/2

D. $-4, \ -1, 2, 5$

Answer: 4

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61. If the roots of $3x^3 - 26x^2 + 52x - 24 = 0$ are in G.P. then roots are

A. $-1, 1, 3, 5$

B. $1, 1, \ -3, \ -5$

C. 8/9, 4/3, 2,3

D. 2/3, 2,6

Answer: 4

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62. If the roots of $x^4 + 5x^3 - 30x^2 - 40x + 64 = 0$ are in G.P. then the roots are

A. 1, -2, 4, -8

B. $\pm$ 1, 2, 3

C. $\pm$ 2i,2,3

D. $-3/2,\ -1/3, 2 \pm \sqrt{3}$

Answer: 1

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63. If the roots of $27x^4 - 195x^3 + 494x^2 - 520x + 192 = 0$ are in G.P. then the roots are

A. $-1, 1, 3, 5$

B. 1, 1, -3, -5

C. 8/9, 4/3, 2, 3

D. $-2,\ 1/2,3$

Answer: 3

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64. If the roots of $x^3 - 42x^2 + 336x - 512 = 0$, are in increasing geometric progression, its common ratio is

A. 2

B. 3

C. 4

D. 6

Answer: 3

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65. If the roots of $3x^3 - 22x^2 + 48x - 32 = 0$ are in H.P. then the roots are

A. 1/4, 1/2, 3/4

B. 4 , 2 4/3

C. 1/3, 1/2, 2/3

D. 3, 2, 3/2

Answer: 2

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66. If the roots of $24x^3 - 26x^2 + 9x - 1 = 0$ are in H.P . Then the roots are

A. 1/2, 1/3 , 1/4

B. 1, 1/3, 1/5

C. 1, 0, -2

D. 1, 1, -2

Answer: 1

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67. The roots of the equation $x^3 - 14x^2 + 56x - 64 = 0$ are in ..... progression

A. Arithmetico-geometiric

B. Harmonic

C. Arithmetic

D. Geometric

Answer: 4

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68. If two of the roots of $2x^3 - 3x^2 - 3x + 2 = 0$ are differ by 3 then the roots are

A. $-1,\ 1/3, 2$

B. $-3/2$, -4/3, -5/3

C. $-1, 1/2, 2$

D. 2, 2, -1

Answer: 3

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69. The difference between two roots of the equation $x^3 - 13x^2 + 15x + 189 = 0$ is 2. then

A. $-3, 7, 9$

B. -3 , -7 , -9

C. 3, -5, 7

D. -3, -7 , 9

Answer: 1

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70. If one root of $18x^3 + 81x^2 + 121x + 60 = 0$ is equal to half of the sum of the other two roots then the roots are

A. -1, 1/3, 2

B. $-3/2$, -4/3, -5/3

C. -1, 1/2, 2

D. 2,2 - 1

Answer: 2

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71. If the product of two of $6x^4 - 29x^3 + 40x^2 - 7x - 12 = 0$ is 2 then the roots are

A. 4/3, 3/2, 1 + $\sqrt{2}, 1 - \sqrt{2}$

B. $-4/3, 3/2, 1 + \sqrt{2}, 1 - \sqrt{2}$

C. $4/3, \ -3/2, 1 + \sqrt{2}, 1 - \sqrt{2}$

D. $-4/3, \ -3/2, 1 + \sqrt{2}, 1 - \sqrt{2}$

Answer: 1

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72. If the product of two of the roots of $x^4 - 5x^3 + 5x^2 + 5x - 6 = 0$ is 3 then the roots are

A. $1, \ -2, 4, \ -8$

B. $\pm$ 1, 2, 3

C. $\pm$ 2i,2,3

D. $-3/2,$ -1/3, $2\pm\sqrt{3}$

Answer: 2

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73. The roots of $x^4 - 12x^3 + 34x^2 - 12x + 1 = 0$ are

A. $-1, \ -2, \ -3, \ -6$

B. 1,2,3,6

C. $-1, \ -2, 3, 6$

D. 1,2,-3, -6

Answer: 2

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74. The condition that the roots of $x^3 + 3px^2 + 3qx + r = 0$ may be in A.P is

A. $2p^3 +$ r = 3pq

B. $p^3r = q^3$

C. $2q^3 + r^2 = 3pqr$

D. none

Answer: 1

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75. The condition that the roots of $x^3 + 3px^2 + 3qx + r = 0$ may be in G.P is

A. $2p^3 +$ r = 3pq

B. $p^3r = q^3$

C. $2q^3 + r^2 = 3pqr$

D. none

Answer: 2

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76. The condition that the roots of $x^3 - bx^2 + cx - d = 0$ are in geometric progression is:

A. $c^3 = b^3$d

B. $c^2 = b^2$d

C. c = bd^3

D. c =bd^2

Answer: 1

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77. The condition that the roots of $x^3 + 3px^2 + 3qx + r = 0$ may be in G.P is

A. $2p^3 + r = 3pq$

B. $p^3 r = q^3$

C. $2q^3 + r^2 = 3pqr$

D. none

Answer: 3

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78. If the roots of $2x^3 - 3x^2 + kx + 6 = 0$ are in A.P then k =

A. 3

B. -5

C. 7

D. -11

Answer: 4

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79. If the roots $4x^3 - 12x^2 + 11x + k = 0$ are in A.P. then k =

A. -3

B. 1

C. 2

D. 3

Answer: 1

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80. If the roots of $x^3 - kx^2 + 14x - 8 = 0$ are in G.P. then k =

A. -3

B. 7

C. 4

D. 0

Answer: 2

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81. If the roots of $x^3 - 14x^2 + 56x + k = 0$ are in G.P. then k =

A. 16

B. -72

C. 56

D. -64

Answer: 4

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82. If the roots of $kx^3 - 18x^2 - 36x + 8 = 0$ are in H.P, then k is

A. 81

B. 27

C. 64

D. 45

Answer: 4

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83. Find the condition that $x^3 - px^2 + qx - r = 0$ may have the sum of its roots zero .

A. $q^3 = 4$(pq - 2r)

B. P^3 = 4(pq -2r)

C. $r^3 = 4$(pr - 2q)

D. p^3 = 4(pq - r)

Answer: 2

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84. The condition that the $x^3 - px^2 + qx - r = 0$ may be the sum of the other two roots is zero =

A. 11/4

B. 17/6

C. pq = r

D. $q^2 = p^2 r$

Answer: 3

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85. If one root of $x^3 + 3x^2 + 5x + k = 0$ may be the sum of the other two roots then k =

A. 44139

B. 17/6

C. 25/9

D. 33/8

Answer: 4

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86. Let A = $\begin{vmatrix} 2 & e^{i\pi} \\ i^2 & i^{2012} \end{vmatrix}$, $C = \frac{d}{dx}\left(\frac{1}{x}\right)|_{x=1}$, $D - \int_{2i} \frac{dx}{x}$. if the sum of two roots of the equation $Ax^3 + Bx^2 + Cx + D = 0$ is equal to zero. Then B =

A. -1

B. 0

C. 1

D. 2

Answer: 4

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87. The condition that the product of two of the roots $x^3 + px^2 + qx + r = 0$ is -1 is

A. r(p + r) + q + 1 = 0

B. q (p + q) + r + 1 = 0

C. p(p + r) + q + 1 = 0

D. p(p + q) + r + 1 = 0

Answer: 1

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88. If the product of two of the roots of $x^3 + kx^2 - 3x + 4 = 0$ may be -1 then K =

A. $7/2$

B. $9/2$

C. $-7/2$

D. $-9/2$

Answer: 3

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89. If $x^4 + px^3 + rx + s^2$ is a perfect square then $p^3 + 8r$ =

A. 1

B. 0

C. 2

D. -1

Answer: 2

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90. If $x^4 + px^3 + rx + s^2$ is a perfect square then ps =

A. $\pm$ r

B. $\pm$ q

C. $\pm$ s

D. -1

Answer: 1

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91. If -1, 2 ,α are roots of $2x^3 + x^2 - 7x - 6 = 0$ then α =

A. 4

B. $-3/2$

C. $7/4$

D. -5

Answer: 2

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92. If 1, -2, 3 are roots of $x^3 - 2x^2 + ax + 6 = 0$ then a =

A. 4

B. $-3/2$

C. $7/4$

D. -5

Answer: 4

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93. If α, β and 1 are the roots of $x^3 - 2x^2 - 5x + 6 = 0$ then $(\alpha, \beta) =$

A. 3, 2

B. 3, -2

C. $-3, 2$

D. 2, -3

Answer: 2

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94. If the product of the roots of

$4x^3 + 16x^2 - 9xa = 0$ is 9 , then find a .

A. 9

B. 18

C. 36

D. 48

Answer: 3

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95. If $x^3 - x^2 + 33x + 5 = 0$ then s_1, s_2, s_3 are

A. 1,33,-5

B. $-1, 33, 5$

C. 1, -33, -5

D. $-1, \ -33, 5$

Answer: 1

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96. If $x^4 - 16x^3 + 86x^2 - 17x + 105 = 0$ then s_1, s_2, s_3, s_4 are

A. 16,86,176, 105

B. 18, 94, 165, 115

C. 8,74,83, 102

D. none

Answer: 1

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97. If $8x^4 - 2x^3 - 27x^2 + 6x + 9 = 0$ then s_1, s_2, s_3, s_4 are

A. 1/4 -27/8, -3/4, 9/8

B. $-$ 1/4, 27/8, 3/4, -9/8

C. $-$ 1/4, -27/8, 3/4 , -9/8

D. 1/4, 27/8, -3/4, 9/8

Answer: 1

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98. If α, β, γ are the roots of $x^3 - 3x + 7 = 0$ then $\alpha + \beta + \gamma =$

A. 0

B. -3

C. -7

D. 1

Answer: 1

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99. If α, β, γ are the roots of $x^3 - 3x + 7 = 0$ then $\alpha\beta\gamma$ =

A. 0

B. -3

C. -7

D. 1

Answer: 3

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100. If α, β, γ are the roots of $4x^3 - 6x^2 + 7x + 3 = 0$ then $\alpha\beta + \alpha\beta + \alpha\gamma =$

A. 4

B. $-3/2$

C. $7/4$

D. 1

Answer: 3

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101. If α, β, γ are roots of $x^3 + 2x^2 - 1 = 0$ then $\frac{1}{\alpha} + \frac{1}{\beta} + \frac{1}{\gamma} =$

A. 0

B. -3

C. -7

D. 2

Answer: A

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102. If α, β, γ are the roots of $2x^3 - 5x^2 + 3x - 1 = 0$ then $\frac{1}{\alpha\beta} + \frac{1}{\beta\gamma} + \frac{1}{\gamma\alpha}$ =

A. 5

B. -3

C. -7

D. 0

Answer: 1

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103. If α, β, γ are the roiots of $x^3 - 10x^2 + 6x - 8 = 0$ then $\alpha^2 + \beta^2 + \gamma^2$ =

A. -88

B. 88

C. -7

D. 1

Answer: 2

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104. If α, β, γ are the roots of $x^3 - px^2 + qx - r = 0$ then $\alpha^2 + \beta^2 + \gamma^2 =$

A. $p^2 - 2q$

B. $p^3 - 3pq + 3r$

C. $p^4 - 4p^2q + 3pr + 2q^2$

D. 2q

Answer: 1

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105. If α, β, γ are the roots of $x^3 + x^2 + x + 1 = 0$ then $(\alpha - \beta)^2 + (\beta - \gamma)^2 + (\gamma - \alpha)^2$ =

A. 2

B. -2

C. 4

D. -4

Answer: 4

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106. If α, β, γ are the roots of $x^3 + x^2 + x + 1 = 0$ then $\alpha^3 + \beta^3 + \gamma^3$ =

A. 1

B. -1

C. 2

D. -2

Answer: 2

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107. If α, β, γ are the roots of $x^3 - px^2 + qx - r = 0$ then $\alpha^3 + \beta^3 + \gamma^3$ =

A. $p^2 - 2q$

B. $p^3 - 3pq + 3r$

C. $p^4 - 4p^2q + 3pr + 2q^2$

D. 2q

Answer: 2

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108. The sum of the cubes of the roots of the equation $x^3 - 6x^2 + 11x - 6 = 0$ is

A. 123

B. 36

C. 149

D. 795

Answer: 2

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109. If α, β, γ are roots of $x^3 - 5x + 4 = 0$ then $\left(\alpha^3 + \beta^3 + \gamma^3\right)^2$ =

A. 12

B. 13

C. 169

D. 144

Answer: 4

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110. The sum of the fourth powers of the roots of the equation $x^3 + x + 1 = 0$is

A. -2

B. -1

C. 1

D. 2

Answer: 4

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111. If α, β, γ are the roots of $x^3 + x^2 + x + 1 = 0$ then $\alpha^4 + \beta^4 + \gamma^4$ =

A. 1

B. 2

C. 3

D. 4

Answer: 3

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112. If α, β, γ are the roots of $x^3 - px^2 + qx - r = 0$ then $\alpha^4 + \beta^4 + \gamma^4$ =

A. $p^2 - 2q$

B. $p^3 - 3pq + 3r$

C. $p^4 - 4p^2q + 4pr + 2q^2$

D. 2q

Answer: 3

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113. If α, β, γ are the roots of $x^3 + 3x + 3 = 0$, then $\alpha^5 + \beta^5 + \gamma^5 =$

A. 6

B. 18

C. 36

D. 45

Answer: 4

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114. If α, β, γ are the roots of $x^3 - px + q = 0$ then $\alpha^6 + \beta^6 + \gamma^6$ =

A. $-2p^3 - 3p^3$

B. $-2p^3 + 3p^3$

C. $2p^3 - 3p^3$

D. $2p^3 + 3p^2$

Answer: 4

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115. If 1,2,3 and 4 are the roots of the eqaution $x^4 + ax^3 + bx^2 + cx + d = 0,$ then a + 2b + c =

A. 3ab + $a^3 - c$

B. 3ab - $a^3 + c$

C. $3ab + a^3 + c$

D. $3ab - a^3 - 3c$

Answer: 4

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116. The sum of the fourth powers of the roots of the equation $x^4 - x^3 - 7x^2 + x + 6 = 0$ is

A. 99

B. -140

C. -99

D. 140

Answer: 1

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117. The sum of the fifth powers of the roots of the equation $x^4 - 3x^3 + 5x^2 - 12x + 4 = 0$ is

A. 123

B. 36

C. 149

D. 795

Answer: 1

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118. If $\alpha, \beta, \gamma, \delta$ are the roots of the equation $x^4 - x^3 - 7x^2 + x + 6 = 0$ then $\sum \alpha^6$ =

A. 123

B. 36

C. 149

D. 795

Answer: 1

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119. The sum of the fourth powers of the roots of the equation $x^5 + px^3 + qx^2 + s = 0$ is

A. $2p^2$

B. $3p^2$

C. 2p

D. 3p

Answer: 1

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120. If α, β, γ are roots of $x^3 + px^2 + qx + r = 0$ then $\sum \frac{1}{\alpha^2}$ =

A. $\left(q^2 - 2pr\right)/r^2$

B. $q^3 - 3pqr + 3r^2$

C. $\left(p^2 - 2q\right)/r^2$

D. $pq/r - 3$

Answer: 1

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121. If α, β, γ are roots of $x^3 + 2x^2 - 3x - 1 = 0$, then $a^{-2} - \beta^{-2} + \gamma^{-2}$ =

A. 12

B. 13

C. 14

D. 15

Answer: 2

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122. If α, β, γ are roots of equation $x^3 - 7x + 7 = 0$, then the value of $\alpha^{-4} + \beta^{-4} + \gamma^{-4}$ is

A. $11/12$

B. $11/7$

C. $3/7$

D. $-3/7$

Answer: 3

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123. If α, β, γ are roots of $x^3 + 2x^2 - 3x - 1 = 0$, then the value of $\alpha^4 + \beta^4 + \gamma^4$ is

A. 123

B. 36

C. 149

D. 795

Answer: 3

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124. If α, β, γ are roots of $2x^3 + 3x^2 - 6x + 3 = 0,$ then the value of $\frac{1}{\alpha^4} + \frac{1}{\beta^4} + \frac{1}{\gamma^4}$ =

A. $11/7$

B. $11/7$

C. $10/3$

D. $-10/3$

Answer: 4

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125. If α, β, γ are roots of a cubic equation $x^3 + 2x^2 - 3x - 1 = 0$, then $\sum \alpha^{-5}$ =

A. -365

B. 518

C. 365

D. -518

Answer: 4

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126. If $\alpha, \beta, \gamma, \delta$ are roots of $x^3 - 4x^2 - x + 2 = 0$ then $\sum \frac{1}{\alpha^2}$ =

A. 2

B. $17/4$

C. $2/3$

D. -3

Answer: 2

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127. If α, β, γ are roots of the equation $x^3 + qx + r = 0$ and S_r denotes the sum of the r the powers of the roots of the equation then $3S_2S_5$ =

A. S_3S_4

B. $2S_3S_4$

C. $4S_3S_4$

D. $5S_3S_4$

Answer: 4

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128. If α, β, γ are roots of $x^3 + px + q = 0$ then $\frac{\alpha^5 + \beta^5 + \gamma^5}{5}$ =

A. $\frac{\alpha^3+\beta^3+\gamma^3}{3}.\frac{\alpha^2+\beta^2+\gamma^2}{2}$

B. $\frac{\alpha^3+\beta^3+\gamma^3}{3}+\frac{\alpha^2+\beta^2+\gamma^2}{2}$

C. $\frac{\alpha^3+\beta^3+\gamma^3}{3}-\frac{\alpha^2+\beta^2+\gamma^2}{2}$

D. none

Answer: 1

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129. If $\alpha+\beta+\gamma=6, \alpha^2+\beta^2+\gamma^2=14$ and $\alpha^3+\beta^3+\gamma^3=36$, then $\alpha^4+\beta^4+\gamma^4$ =

A. 98

B. 103

C. 224

D. 342

Answer: 1

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130. If $\alpha+\beta+\gamma=1, \alpha^2+\beta^2+\gamma^2=2$ and $\alpha^3+\beta^3+\gamma^3=3,$ then $\alpha^5+\beta^5+\gamma^5=$

A. 6

B. 18

C. 36

D. 45

Answer: 1

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131. If α, β, γ are roots of a cubic equation satisfying the relations $\alpha+\beta+\gamma=2, \alpha^2+\beta^2+\gamma^2=6$ and $\alpha^3+\beta^3+\gamma^3=8$ then the cubic equation is

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

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

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

D. $x^3 - 2x^2 - x - 2 = 0$

Answer: 2

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132. If $\alpha, \beta, \gamma, \delta$ are roots of $x^4 + px^3 + qx^2 + rx + s = 0$ then $\sum \alpha^2\beta$ =

A. $3r + pq$

B. 3r - pq

C. pr + 4s

D. pr - 4s

Answer: 2

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133. If $\alpha, \beta, \gamma, \delta$ are roots of $x^4 + px^3 + qx^2 + rx + s = 0$ then $\sum \alpha^2 \beta\gamma$=

A. $3r + pq$

B. 3r - pq

C. pr + 4s

D. pr - 4s

Answer: 4

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134. If $\alpha, \beta, \gamma, \delta$ are roots of the equation $ax^4 + 4bx^3 + 6cx^2 + 4dx + e = 0$, then $\sum (\alpha - \beta)^2$ =

A. $\frac{48}{a^2}\left(b^2 + ac\right)$

B. $-\frac{48}{a^2}\left(b^2+ac\right)$

C. $\frac{48}{a^2}\left(b^2-ac\right)$

D. $-\frac{48}{a^2}\left(b^2-ac\right)$

Answer: 3

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135. If $\alpha, \beta, \gamma, \delta$ are roots of $ax^4+4bx^3+6cx^2+4dx+e=0$, then $\sum\alpha^2\beta$ =

A. $\frac{12}{a^2}(ad-2bc)$

B. $-\frac{12}{a^2}(ad-2bc)$

C. $\frac{12}{a^2}(ad+2bc)$

D. $-\frac{12}{a^2}(ad+2bc)$

Answer: 1

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136. If α, β, γ are roots of $x^3 + px^2 + qx + r = 0$ then $\sum \alpha^3\beta^3$ =

A. $\left(q^2 - 2pr\right)/r^2$

B. $q^3 - 3pqr + 3r^2$

C. $\left(p^2 - 2q\right)/r^2$

D. $pq/r - 3$

Answer: 2

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137. If α, β, γ are roots of $x^3 + px^2 + qx + r = 0$ then $\sum \frac{1}{\alpha^2\beta^2}$

A. $\left(q^2 - 2pr\right)/r^2$

B. $q^3 - 3pqr + 3r^2$

C. $\left(p^2 - 2q\right)/r^2$

D. $pq/r - 3$

Answer: 3

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138. If α, β, γ are roots of $x^3 + px^2 + qx + r = 0$ then $\frac{\beta^2 + \gamma^2}{\beta\gamma} + \frac{\gamma^2 + \alpha^2}{\gamma\alpha} + \frac{\alpha^2 + \beta^2}{\alpha\beta} =$

A. $\left(q^2 - 2pr\right)/r^2$

B. $q^3 - 3pqr + 3r^2$

C. $\left(p^2 - 2q\right)/r^2$

D. $pq/r - 3$

Answer: 4

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139. If α, β, γ are roots of the equation $x^3 + px^2 + qx + r = 0$, then $(\alpha + \beta)(\beta + \gamma)(\gamma + \alpha) =$

A. $2\left(p^2-3q\right)$

B. r - pq

C. q^2-2pr

D. $\frac{p^2-2q}{r^2}$

Answer: 2

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140. If α, β, γ are roots of the equation $x^3+px^2+qx+r=0$, then $\sum \alpha^2\beta^2$ =

A. $2\left(p^2-3q\right)$

B. r - pq

C. q^2-2pr

D. $\frac{p^2-2q}{r^2}$

Answer: 3

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141. If α, β, γ are roots of $x^3 - 2x^2 + 3x - 4 = 0$, then the value of $\alpha^2\beta^2 + \beta^2\gamma^2 + \gamma^2\alpha^2$ is

A. -7

B. -5

C. -3

D. 0

Answer: 1

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142. If α, β, γ are roots of the equation$x^3 + px^2 + qx + r = 0$, then $\sum \frac{1}{\alpha\beta}$ =

A. $2\left(p^2 - 3q\right)$

B. r - pq

C. $\frac{p}{r}$

D. $\frac{p^2 - 2q}{r^2}$

Answer: 3

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143. If α, β, γ are roots of the equation $x^3 + px^2 + qx + r = 0$, then $\sum(\alpha - \beta)^2$ =

A. $2\left(p^2 - 3q\right)$

B. r - pq

C. $q^2 - 2pr$

D. $\frac{p^2 - 2q}{r^2}$

Answer: 1

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144. If α, β, γ are roots of the equation $px^3 + qx^2 + rx + s = 0$ then $\sum \alpha^2\beta^2 =$

A. $\frac{r^2 + 2qs}{p^2}$

B. $\frac{r^2 - 2qs}{p^2}$

C. $\frac{2qs + r^2}{p^2}$

D. $\frac{2qs - r^2}{p^2}$

Answer: 2

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145. If α, β, γ are roots of $x^3 + qx + r = 0$, then $\sum (\alpha\beta)^2$ =

A. q

B. q^2

C. $-q$

D. -3

Answer: 2

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146. If α, β, γ are roots of $x^3 - px^2 + qx - r = 0$ then $\sum \alpha(\beta + \gamma)$ =

A. $p^2 - 2q$

B. $p^3 - 3pq + 3r$

C. $p^4 - 4p^2q + 3pr + 2q^2$

D. 2q

Answer: 4

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147. If α, β, γ are roots of $x^3 - px^2 + qx - r = 0$ then $\sum \alpha^2(\beta + \gamma)$ =

A. pq - 3r

B. $\frac{pq-3r}{r}$

C. $\frac{q^2-2pr}{r^2}$

D. $\frac{p^2-2q}{r^2}$

Answer: 1

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148. If α, β, γ are roots of $x^3 - px^2 + qx - r = 0$ then $\alpha^3\beta^3\gamma^3$ =

A. pq + 3r

B. pq - 3r

C. $p^3 - 3pq + 3r$

D. r^3

Answer: 4

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149. If α, β, γ are roots of $x^3 - px^2 + qx - r = 0$ then $(\alpha+\beta)^{-1} + (\beta+\gamma)^{-1} + (\gamma+\alpha)^{-1}$ =

A. $\frac{q^2 - 2pr}{r^2}$

B. $\frac{p^2 + q}{pq - r}$

C. $\frac{p^2 - 2q}{r^2}$

D. none

Answer: 2

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150. If α, β, γ are roots of $x^3 - 2x^2 + 3x - 4 = 0$, then $\sum a^2\beta^2$ =

A. 7

B. -7

C. 6

D. -6

Answer: 2

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151. If α, β, γ are roots of the equation $3x^3 + 6x^2 - 9x + 2 = 0$ then $\sum(\alpha/\beta)$ =

A. 12

B. -12

C. 3

D. -3

Answer: 2

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152. If α, β, γ are roots of $x^3 - 2x^2 + 3x - 4 = 0$, then $\sum \alpha^2\beta^2$ =

A. 7

B. -7

C. 6

D. -6

Answer: 4

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153. If α, β, γ are roots of the equation $x^3 - 6x^2 + 11x + 6 = 0$, then $\sum \alpha^2\beta + \sum \alpha\beta^2$ =

A. 80

B. 84

C. 90

D. -84

Answer: 2

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154. Suppose α, β, γ are the roots of $x^3 + x^2 + x + 2 = 0$. Then the value of $\left(\frac{\alpha + \beta - 2\gamma}{\gamma}\right)\left(\frac{\beta + \gamma - 2\alpha}{\alpha}\right)\left(\frac{\gamma + \alpha - 2\beta}{\beta}\right)$ is

A. $-\frac{47}{2}$

B. $\frac{47}{2}$

C. -47

D. 47

Answer: 1

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155. If α, β, γ are roots of $x^3 + ax^2 + bx + c = 0$ then $\sum \alpha^2\beta$ =

A. 3c + ab

B. 3c - ab

C. 3a - bc

D. 3a + bc

Answer: 2

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156. If α, β, γ are roots of $x^3 - ax^2 + bx + c = 0$ then $(\alpha^2 + 1)(\beta^2 + 1)(\gamma^2 + 1)$ =

A. $(c - a)^2 + (b - 1)^2$

B. $(c - a)^2 - (b - 1)^2$

C. $(c + a)^2 + (b + 1)^2$

D. $(c + a)^2 - (b + 1)^2$

Answer: 1

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157. If α, β, γ are roots of the equation $x^3 - px^2 + qx - r = 0$, then $\sum \alpha^2\beta$=

A. pq + 3r

B. pq - 3r

C. $p^3 - 3pq + 3r$

D. p^3 + 3pq - 3r

Answer: 2

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158. If $\alpha, \beta, \gamma, \delta$ are roots of $x^4 - 4x^2 - x + 2 = 0$ then $\sum \alpha^2\beta$ =

A. 2

B. $17/4$

C. $2/3$

D. -3

Answer: 4

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159. If $\alpha_1, \alpha_2, \ldots\ldots\ldots, \alpha_n$ are the roots of $x^n + px + q = 0$, then $(\alpha_n - \alpha_1)(\alpha_n - \alpha_2)\ldots\ldots\ldots(\alpha_n - \alpha_{n-1}) =$

A. n

B. 0

C. 1

D. -1

Answer: 1

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160. If $\alpha_1, \alpha_2, \ldots\ldots\ldots, \alpha_n$ are the roots of $x^n + px + q = 0$, then $(\alpha_n - \alpha_1)(\alpha_n - \alpha_2)\ldots\ldots\ldots(\alpha_n - \alpha_{n-1}) =$

A. $(1 + p_2 + p_4 \ldots.)^2 + (p_1 + p_3 + p_5 \ldots)^2$

B. $(1 - p_2 + p_4 \ldots.)^2 + (p_1 - p_3 + p_5 \ldots)^2$

C. $(1 + p_2 + p_4 \ldots.)^2 - (p_1 + p_3 + p_5 \ldots)^2$

D. $(1 - p_2 + p_4 \ldots.)^2 - (p_1 - p_3 + p_5 \ldots)^2$

Answer: 2

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161. if $\frac{5x^2 + 2}{x^3 + x} = \frac{A_1}{x} + \frac{A_2 x + A_3}{x^2 + 1}, then(A_1, A_2, A_3) =$

A. no imaginary roots

B. no positive roots

C. no negative roots

D. no real roots

Answer: 1

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162. If α, β, γ are roots of equation $x^3 - 10x^2 + 7x + 8 = 0$. If a = $\alpha + \beta + \gamma, b = \alpha^2 + \beta^2 + \gamma^2, c = \frac{1}{\alpha} + \frac{1}{\beta} + \frac{1}{\gamma}, d = \frac{\alpha}{\beta\gamma} + \frac{\beta}{\gamma\beta} + \frac{\gamma}{\alpha\beta}$ then a + b + c + d =

A. $\frac{765}{8}$

B. $\frac{576}{8}$

C. $\frac{675}{8}$

D. $\frac{657}{8}$

Answer: 3

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163. Let α, β, γ be the roots of $x^3 + x + 10 = 0$ and $\alpha_1 = \frac{\alpha+\beta}{\gamma^2}, \beta_1 = \frac{\beta+\gamma}{\alpha^2}, \gamma_1 = \frac{\gamma+\alpha}{\beta^2}$. Then, the value of $(\alpha_1^3 + \beta_1^3 + \gamma_1^3) - \frac{1}{10}(\alpha_1^2 + \beta_1^2 + \gamma_1^2)$ is

A. $\frac{1}{10}$

B. $\frac{1}{5}$

C. $\frac{3}{10}$

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

Answer: 3

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164. The real number k for which the equation, $2x^3 + 3x + k = 0$ has two distinct real roots in [0,1]

A. lies between -1 and 0

B. does not exist

C. lies between 1 and 2

D. lies between 2 and 3

Answer: 2

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165. The number of real roots of the equation $x^5 + 3x^3 + 4x + 30 = 0$ is

A. 1

B. 2

C. 3

D. 5

Answer: 1

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Exercise 1 B

1. The equation whose roots are those of equation $x^4 - 3x^3 + 5x^2 - 2 = 0$ with contrary signs

A. $x^4 + 3x^3 + 5x^2 - 2 = 0$

B. $x^7 + 3x^5 + x^3 + x^2 + 7x - 2 = 0$

C. $x^3 - 3x^2 + 8x^2 + 4 = 0$

D. $10x^3 - 13x^2 + 18x^2 + 40 = 0$

Answer: 1

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2. The equation whose roots are opposite in sign and equal in magnitude of the roots of $x^7 + 3x^5 + x^3 - x^2 + 7x + 2 = 0$ is

A. $x^5 - 4x^4 + 12x^3 - 16x^2 + 64x + 96 = 0$

B. $x^7 + 3x^5 + x^3 + x^2 + 7x - 2 = 0$

C. $x^5 + 11x^4 + 42x^3 + 57x^2 - 13x - 60 = 0$

D. $2x^4 - 5x^3 - 7x^2 + 3x - 1 = 0$

Answer: 2

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3. If α, β, γ are the roots of $3x^3 - 5x^2 - 7x + 1 = 0$ thent the equation whose roots are $-\alpha, -\beta, -\gamma$ is

A. $3x^3 + 5x^2 - 7x - 1 = 0$

B. $9x^3 + 6x^2 - 4x - 1 = 0$

C. $x^3 - 3x^2 + 8x^2 + 4 = 0$

D. $10x^3 - 13x^2 + 18x^2 + 40 = 0$

Answer: 1

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4. The equation whose roots are the negatives of the roots of the equation $x^7 + 3x^5 + x^3 - x^2 + 7x + 2 = 0$ is

A. $x^7 + 3x^5 + x^3 + x^2 - 7x + 2 = 0$

B. $x^7 + 3x^5 + x^3 + x^2 + 7x - 2 = 0$

C. $x^7 + 3x^5 + x^3 - x^2 - 7x - 2 = 0$

D. $x^7 + 3x^5 + x^3 - x^2 + 7x - 2 = 0$

Answer: 2

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5. If -2, 5, 7, - 11 are the roots of $ax^4 + bx^3 + cx^2 + dx + e = 0$ then the roots of $ax^4 - bx^3 + cx^2 - dx + e = 0$ are

A. 2,5,7,11

B. 2, -5, -7, 11

C. 2, 5 , -7 , - 11

D. $-2, \ -5, 7, 11$

Answer: 2

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6. The equation whose roots are multiplied by 3 of those of $2x^3 - 3x^2 + 4x - 5 = 0$ is

A. $x^3 - x^2 + 6x - 8 = 0$

B. $x^3 - 6x^2 + 7x + 2 = 0$

C. $2x^3 - 9x^2 + 36x - 135 = 0$

D. $x^4 + 3x^3 + 4x^2 - 28x - 16 = 0$

Answer: 3

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7. The equation whose roots are diminish by 3 then those of $x^4 - 5x^3 - 20x^2 + 3x + 17 = 0$ is

A. $x^3 - x^2 + 6x - 8 = 0$

B. $x^3 - 6x^2 + 7x + 2 = 0$

C. $2x^3 - 9x^2 + 36x - 135 = 0$

D. $x^4 + 6x^3 + 8x^2 - 56x - 32 - 0$

Answer: 4

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8. The cubic equation whose roots are thrice to each of the roots of $x^3 + 2x^2 - 4x + 1 = 0$ is

A. $x^3 - 6x^2 + 36x + 27 = 0$

B. $x^3 + 6x^2 + 36x + 27 = 0$

C. $x^3 - 6x^2 - 36x + 27 = 0$

D. $x^3 + 6x^2 - 36x + 27 = 0$

Answer: 4

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9. Find the algebraic equation whose roots are 2 times the roots of $x^5 - 2x^4 + 3x^3 - 2x^2 + 4x + 3 = 0$

A. $x^5 - 4x^4 + 12x^3 - 16x^2 + 64x + 96 = 0$

B. $x^7 + 3x^5 + x^3 + x^2 + 7x - 2 = 0$

C. $x^5 + 11x^4 + 42x^3 + 57x^2 - 13x - 60 = 0$

D. $2x^4 - 5x^3 - 7x^2 + 3x - 1 = 0$

Answer: 1

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10. If α, β, γ are the roots of $x^3 + 2x^2 - 4x - 3 = 0$ then the equation whose roots are $\alpha/3, \beta/3, \gamma/3$ is

A. $3x^3 + 5x^2 - 7x - 1 = 0$

B. $9x^3 + 6x^2 - 4x - 1 = 0$

C. $x^3 - 3x^2 + 8x^2 + 4 = 0$

D. $10x^3 - 13x^2 + 18x^2 + 40 = 0$

Answer: 2

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11. If $2, -2, 4$ are the roots of $ax^3 + bx^2 + cx + d = 0$ then the roots of $8ax^3 + 4bx^2 + 2cx + d = 0$ are

A. 2, -2 , 4

B. 1/2, -1/2, 1/4

C. 1, -1, 2

D. 4, -4, 8

Answer: 3

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12. If 1, -2, 3 are the roots of $ax^3 + bx^2 + cx + d = 0$ then the roots of $ax^3 + 3bx^2 + 9cx + 27d = 0$ are

A. 1, -2, 3

B. $-1, 2, -3$

C. 1/3, -2/3, 1

D. 3, -6, 9

Answer: 4

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13. If the roots of $ax^3 + bx^2 + cx + d = 0$ are in G.P. then the roots of $ak^3x^3 + bk^2x^2 + ckx + d = 0$ are in

A. A.P

B. G.P

C. H.P

D. none

Answer: 2

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14. The equation whose roots are reciprocals of the roots of $6x^6 - 25x^5 + 31x^4 - 31x^2$ + 25x - 6 = 0 ` is

A. $x^3 - 6x^2 + 7x + 2 = 0$

B. $4x^3 - 2x^3 + 6x^2 - 3x - 1 = 0$

C. $6x^6 - 25x^5 + 31x^4 - 31x^2 + 25x - 6 = 0$

D. $x^4 + 3x^3 + 4x^2 - 28x - 16 = 0$

Answer: 3

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15. Let $\alpha \neq 1$ be a real root of the equation $x^3 - ax^2 + ax - 1 = 0$, where a $\neq$ - 1 is a real number, then a root of this equation, among the following , is :

A. α^2

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

C. $\frac{1}{\alpha}$

D. $-\frac{1}{\alpha^2}$

Answer: 3

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16. If 3/4, -5/2, 1/2 , -3 are the roots of $ax^4 + bx^3 + cx^2 + dx + e = 0$ then the roots of $ex^4 + dx^3 + cx^2 + bx + d = 0$ are

A. 3/4, -5/2, 1/2, -3

B. $-3/4, 5/2, \ -1/2, 3$

C. 4/3, -2/5, 2, -1/3

D. $-4/3, 2/5, \ -2, 1/3$

Answer: 3

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17. If the roots of $ax^3 + bx^2 + cx + d = 0$ are in A.P then the roots of $dx^3 + cx^2 + bx + a = 0$ are in

A. A.P

B. G.P

C. H.P

D. none

Answer: 3

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18. If the roots of $ax^3 + bx^2 + cx + d = 0$ are in H.P then the roots of $dx^3 - cx^2 + bx - a = 0$ are in

A. A.P

B. G.P

C. H.P

D. none

Answer: 1

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19. If the roots of $ax^3 + bx^2 + cx + d = 0$ are in G.P then the roots of $dx^3 - cx^2 + bx - a = 0$ are in

A. A.P

B. G.P

C. H.P

D. none

Answer: 2

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20. The equation whose roots are exceed by 1 then those of $x^3 - 5x^2 + 6x - 3 = 0$ is

A. $2x^3 - 9x^2 + 8x + 9 = 0$

B. $x^3 - 8x^2 + 19x - 15 = 0$

C. $x^3 - 8x^2 + 23x - 23 = 0$

D. $4x^3 - 2x^3 + 6x^2 - 3x - 1 = 0$

Answer: 2

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21. The equation whose roots are exceed by 2 then those $x^4 + x^3 - 10x^2 + 4x + 24 = 0$ is

A. $x^4 - 7x^3 + 8x^2 + 24x - 16 = 0$

B. $x^5 - 7x^3 + 12x^2 - 7x = 0$

C. $x^4 + 7x^3 - 11x^2 - 144x - 208 = 0$

D. $x^5 + 11x^4 + 45x^3 + 81x^2 + 50x - 6 = 0$

Answer: 1

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22. The equation whose roots are exceed by 1 then those of $x^5 + 5x^4 + 3x^3 + x^2 + x - 1 = 0$ is

A. $x^4 - 9x^3 + 20x^2 = 0$

B. $x^5 - 7x^3 + 12x^2 - 7x = 0$

C. $x^4 + 7x^3 - 11x^2 - 144x - 208 = 0$

D. $x^5 + 11x^4 + 45x^3 + 81x^2 + 50x - 6 = 0$

Answer: 2

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23. The equation whose roots are diminish by 1 than those of $x^3 + 2x^2 + 3x + 4 = 0$ is

A. $x^3 + 5x^2 + 10x + 10 = 0$

B. $x^3 + 8x^2 + 20x + 16 = 0$

C. $x^3 - 8x^2 + 16x - 9 = 0$

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

Answer: 1

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24. The equation whose roots are diminish by 3 then those of $x^4 - 5x^3 - 20x^2 + 3x + 17 = 0$ is

A. $x^4 - 9x^3 + 20x^2 = 0$

B. $x^5 - 7x^3 + 12x^2 - 7x = 0$

C. $x^4 + 7x^3 - 11x^2 - 144x - 208 = 0$

D. $x^5 + 11x^4 + 45x^3 + 81x^2 + 50x - 6 = 0$

Answer: 3

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25. The equation whose roots are diminish by 3 then those $x^5 - 4x^4 + 3x^2 - 4x + 6 = 0$ is

A. $x^5 - 4x^4 + 12x^3 - 16x^2 + 64x + 96 = 0$

B. $x^7 + 3x^5 + x^3 + x^2 + 7x - 2 = 0$

C. $x^5 + 11x^4 + 42x^3 + 57x^2 - 13x - 60 = 0$

D. $2x^4 - 5x^3 - 7x^2 + 3x - 1 = 0$

Answer: 3

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26. If 2, -3 , 5 are the roots of $ax^3 + bx^2 + cx + d = 0$ then the roots of a $(x-1)^3 + b(x-1)^2 + c(x-1) + d$ = 0 are

A. 2, -3, 5

B. 1, -4, 4

C. 3, -2, 6

D. 1/2, -1/3, 1/5

Answer: 3

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27. If $\pm 2,\ \pm 3$ are the roots of $ax^4 + bx^3 + cx^2 + dx + e = 0$ then the roots of a$(x+1)^4 + b(x+1)^2 + c(x+1)^2 + a(x+1) + e = 0$ are

A. 1,2, -3 , -4

B. $-1,\ -2, 3, 4$

C. 1, 1/2 1/3, 1/4

D. 1,2,3,4

Answer: 1

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28. If the roots of $ax^3 + bx^2 + cx + d = 0$ are in A.P then the roots of $a(x+k)^3 + b(x+k)^2 + c(x+k) + d = 0$ are in

A. A.P

B. G.P

C. H.P

D. none

Answer: 1

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29. Form the equation whose roots are m times the roots of the equation $x^3 + \frac{x^2}{4} - \frac{x}{16} + \frac{1}{72} = 0$ and deduce the case when m =12 .

A. 3

B. 12

C. 9

D. 4

Answer: 2

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30. The transformed equation with integer coeficients whose roots are multiplied by some constant of those of $x^3 - 4x^2 - \frac{1}{4}x - \frac{1}{9} = 0$ is

A. $y^4 - y^3 + 3y^2 - 10y + 1 = 0$

B. $y^3 - 24y^2 - 9y - 24 = 0$

C. $y^4 - 2y^3 + 6y - 6 = 0$

D. $y^4 - 5y^3 + 3y^2 - 9y + 27 = 0$

Answer: 2

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31. The transformed equation with integer co-effcients whose roots are multipled by some constant of those of $x^4 - \frac{1}{2}x^3 + \frac{3}{4}x^2 - \frac{5}{4}x + \frac{1}{16} = 0$ is

A. $y^4 - y^3 + 3y^2 - 10y + 1 = 0$

B. $y^3 - 24y^2 - 9y - 24 = 0$

C. $y^4 - 2y^3 + 6y - 6 = 0$

D. $y^4 - 5y^3 + 3y^2 - 9y + 27 = 0$

Answer: 1

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32. The transformed equation of $x^3 - 4x^2 + \frac{1}{4}x - \frac{1}{9} = 0,$ by eliminating fractional coefficients is

A. $y^3 + 15y^2 + 52y - 36 = 0$

B. $y^4 - 24y^2 + 65y - 55 = 0$

C. $4x^4 - 2x^3 + 6x^2 - 3x - 1 =$

D. $y^3 - 24y^2 + 9y - 24 = 0$

Answer: 4

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33. The transformed equation with integer coefficients and unity for the coefficient of first term, whose roots are multiplied by some constant of those of $3x^4 - 5x^3 + x^2 - x + 1 = 0$ is

A. $y^4 - y^3 + 3y^2 - 10y + 1 = 0$

B. $y^3 - 24y^2 - 9y - 24 = 0$

C. $y^4 - 2y^3 + 6y - 6 = 0$

D. $y^4 - 5y^3 + 3y^2 - 9y + 27 = 0$

Answer: 4

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34. The transformed equation of $x^3 - \frac{5}{2}x^2 - \frac{7}{18}x + \frac{1}{108} = 0$, by removing fractional coefficients, is

A. $x^4 - 25x^3 + 357x^2 - 11700 = 0$

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

C. $x^3 - 3x^2 - 24x - 216 = 0$

D. $x^3 - 15x^2 - 14x + 2 = 0$

Answer: 4

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35. The transformed equation of $a^4b^3x^4 + a^3b^2x^3 + a^2b^2x^2 + bx + a = 0$ into another with integral coefficients and unity for the coefficient of the first term is

A. $x^4 + ax^3 + a^2bx^2 + a^2bx + a^5b = 0$

B. $x^4 + ax^3 - a^2bx^2 + a^2bx - a^5b = 0$

C. $x^4 - ax^3 + a^2bx^2 - a^2bx + a^5b = 0$

D. $x^4 - ax^3 + a^2bx^2 + a^2bx - a^5b = 0$

Answer: 1

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36. The transformed equation of $x^3 - 6x^2 + 5x + 8 = 0$, by eliminating second term is

A. $x^3 + 7x - 2 = 0$

B. $x^3 - 7x + 2 = 0$

C. $x^3 + 7x + 2 = 0$

D. $x^3 - 7x - 2 = 0$

Answer: 2

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37. Each of the roots of the equation $x^3 - 6x^2 + 6x - 5 = 0$ are increased by k so that the new transformed equation does not contain x^2 term. Then k =

A. $1/3$

B. $1/2$

C. 1

D. -2

Answer: 4

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38. The transformed equation of $x^4 + 8x^3 + x - 5 = 0$ by eliminating second term is

A. $y^5 - 7y^3 + 12y^2 - 7y = 0$

B. $y^3 - 2y + 1 = 0$

C. $y^4 - 4y^2 + 1 = 0$

D. $y^4 - 24y^2 + 65y - 55 = 0$

Answer: 4

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39. The transformed equation of $x^4 + 4x^3 + 2x^2 - 4x - 2 = 0$, by eliminating second term is

A. $y^5 - 7y^3 + 12y^2 - 7y = 0$

B. $y^3 - 2y + 1 = 0$

C. $y^4 - 4y^2 + 1 = 0$

D. $y^4 - 24y^2 + 65y - 55 = 0$

Answer: 3

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40. The transformed equation of $x^5 + 5x^4 + 3x^3 + x^2 + x - 1 = 0$, by eliminating second terms is

A. $y^5 - 7y^3 + 12y^2 - 7y = 0$

B. $y^3 - 2y + 1 = 0$

C. $y^4 - 4y^2 + 1 = 0$

D. $y^4 - 24y^2 + 65y - 55 = 0$

Answer: 1

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41. Number of transformed equations of $x^3 + 2x^2 + x + 1 = 0$ by eliminating third term is

A. $x^4 + 6x^3 - 12x + 8 = 0$ or $x^4 - 6x^3 + 42x + 53 = 0$

B. $x^4 + 6x^3 - 12x - 8 = 0$ or $x^4 - 6x^3 + 42x - 53 = 0$

C. $x^3 + x^2 + 1 = 0$ or $27x^3 - 27x^2 + 23 = 0$

D. $x^3 - x^2 + 1 = 0$ or $27x^3 + 27x^2 + 23 = 0$

Answer: 4

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42. The transformed equation of $x^4 + 2x^3 - 12x^2 + 2x - 1 = 0$ by eliminating third term is

A. $x^4 + 6x^3 - 12x + 8 = 0$ or $x^4 - 6x^3 + 42x + 53 = 0$

B. $x^4 + 6x^3 - 12x - 8 = 0$ or $x^4 - 6x^3 + 42x - 53 = 0$

C. $x^3 + x^2 + 1 = 0$ or $27x^3 - 27x^2 + 23 = 0$

D. $x^3 - x^2 + 1 = 0$ or $27x^3 + 27x^2 + 23 = 0$

Answer: 2

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43. The equation whose roots are square of the roots of $x^3 - 2x^2 - 2x + 3 = 0$ is

A. $x^3 + 5x^2 + 10x + 10 = 0$

B. $x^3 + 8x^2 + 20x + 16 = 0$

C. $x^3 - 8x^2 + 16x - 9 = 0$

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

Answer: 3

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44. The cubic equation whose roots are the squares of the roots of $x^3 - 2x^2 + 10x - 8 = 0$ is

A. $x^3 + 8x^2 + 68x - 64 = 0$

B. $x^3 + 16x^2 - 68x - 64 = 0$

C. $x^3 - 16x^2 + 68x - 64 = 0$

D. $x^3 + 16x^2 + 68x - 64 = 0$

Answer: 4

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45. The equation whose roots are square of the roots of $x^3 + x^2 + x + 1 = 0$ is

A. $x^3 + 5x^2 + 10x + 10 = 0$

B. $x^3 + 8x^2 + 20x + 16 = 0$

C. $x^3 - 8x^2 + 16x - 9 = 0$

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

Answer: 4

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46. Find the polynomial equation whose roots are the squares of the roots of $x^4 + x^3 + 2x^2 + x + 1 = 0$

A. $x^4 + 3x^3 + 4x^2 + 3x + 1 = 0$

B. $x^3 + 33x^2 + 12x + 8 = 0$

C. $y^5 - 7x^3 + 12y^2 - 7y = 0$

D. $y^3 - 2y + 1 = 0$

Answer: 1

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47. The equation whose roots are square of the roots of $x^4 + x^3 + x^2 + x + 1 = 0$ is

A. $x^4 + 3x^3 + 4x^2 + 3x + 1 = 0$

B. $x^4 - 5x^3 - 11x + 3 = 0$

C. $x^3 - 23x^2 + 13x - 36 = 0$

D. $x^4 + x^3 + x^2x + 1 = 0$

Answer: 4

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48. If 2, 3, 5 are the roots of $ax^3 + bx^2 + cx + d = 0$ then the roots of $ax\sqrt{x} + bx + c\sqrt{x} + d = 0$ are

A. $2, 3, 5$

B. $4, 6, 10$

C. 4, 9, 25

D. $\sqrt{2}, \sqrt{3}, \sqrt{5}$

Answer: 3

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49. Form the polynomial equation whose roots are cubes of the roots of $x^3 + 3x^2 + 2 = 0$

A. $x^4 + 3x^3 + 4x^2 + 3x + 1 = 0$

B. $x^3 + 33x^2 + 12x + 8 = 0$

C. $y^5 - 7x^3 + 12y^2 - 7y = 0$

D. $y^3 - 2y + 1 = 0$

Answer: 2

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50. If α, β, γ are the roots of $x^3 + qx + r = 0$ then the equation whose roots $\frac{\beta}{\gamma} + \frac{\gamma}{\beta}, \frac{\gamma}{\alpha} + \frac{\alpha}{\beta}, \frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ is

A. $x^3 - q^2 - x^2 - 2qr^2x - r^4 = 0$

B. $rx^3 + q(1-r)x^2 + (1-r)^3 = 0$

C. $x^3 - 2qx^2 + q^2x + r^2 = 0$

D. $r^2x^3 + 3r^2x^2 + \left(3r^2 + q^3\right)x + 2q^3 + r^2 = 0$

Answer: 4

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51. If α, β, γ are the roots of $x^3 + 2x + 5 = 0$ thent the equation whose roots $\beta\gamma + \frac{1}{\alpha}, \gamma\alpha + \frac{1}{\beta}, \alpha\beta + \frac{1}{\gamma}$ is

A. $5x^3 + 8x - 64 = 0$

B. $5x^3 - 8x^2 + 64 = 0$

C. $5x^2 - 8x^2 - 64 = 0$

D. $5x^2 + 8x^2 - 64 = 0$

Answer: 3

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52. If α, β, γ are the roots of $x^3 + 3x + 4 = 0$ then the equation whose roots $\frac{\beta}{\gamma} + \frac{\gamma}{\beta}, \frac{\gamma}{\alpha} + \frac{\alpha}{\gamma}, \frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ is

A. $16x^3 + 48x^2 + 75x + 70 = 0$

B. $16x^3 - 48x^2 + 75x + 70 = 0$

C. $16x^3 + 48x^2 - 75x + 70 = 0$

D. $16x^2 - 48x^2 + 75x - 70 = 0$

Answer: 1

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53. If α, β, γ are the roots of $x^3 + qx + r = 0$ then the equation whose roots $(\beta - \gamma)^2, (\gamma - \alpha)^2, (\alpha - \beta)^2$ is

A. $x^3 + 6qx^2 + 9q^2x + 4q^2 + 27r^2 = 0$ is

B. $x^3 + 2qx^2 + 9q^2x + 4q^2 + 27 = 0$

C. $x^3 + 3qx^2 + 6q^2x + 2q^2 + 27 = 0$

D. $x^3 + qx^2 + 3q^2x + 6q^2 + 27 = 0$

Answer: 1

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54. If α, β, γ are the roots of $x^3 + qx + q = 0$ then the equation whose roots $\beta\gamma + \frac{1}{\alpha}, \gamma\alpha + \frac{1}{\beta}, \alpha\beta + \frac{1}{\gamma}$ is

A. $x^3 - q^2 - x^2 - 2qr^2x - r^4 = 0$

B. $rx^3 + q(1-r)x^2 + (1-r)^3 = 0$

C. $x^3 - 2qx^2 + q^2x + r^2 = 0$

D. $r^2x^3 + 3r^2x^2 + \left(3r^2 + q^3\right)x + 2q^3 + r^2 = 0$

Answer: 2

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55. If α, β, γ are the roots of $x^3 + 3px + q = 0$ then the equation whose roots are $\frac{\alpha+1}{\beta+\gamma-\alpha}, \frac{\beta+1}{\gamma+\alpha-\beta}$ and $\frac{\gamma+1}{\alpha+\beta-\gamma}$ is

A. $8y^3 + 12y^2 + (6+6p)y + 1 + 3p - q = 0$

B. $8qy^3 - 12y(q+p)y^2 + 6(q-2p)y + (q+3p-1) = 0$

C. $8qy^3 + 12(q+p)y^2 + 6(q-2p)y + (q+3p-1) = 0$

D. $8qy^3 - 12(q-p)y^2 - 6(q-2p)y + (q-3p+1) = 0$

Answer: 4

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56. If α, β, γ are the roots of $x^3 + 3x + 2 = 0$ then the equation whose roots $(\beta-\gamma)^2, (\gamma-\alpha)^2, (\alpha-\beta)^2$ is

A. $y^3 - 29y^2 - 50y + 625 = 0$

B. $y^3 + 18y^2 + 81y + 216 = 0$

C. $y^4 - 24y^2 + 65y - 55 = 0$

D. $5y^5 - 12y^2 + 68y - 155 = 0$

Answer: 2

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57. If α, β, γ are the roots of $x^3 - 7x + 6 = 0$ then find the equation whose roots are $(\alpha - \beta)^2, (\beta - \gamma)^2, (\gamma - \alpha)^2$

A. $x^3 - 42x^2 + 441x - 400 = 0$

B. $x^3 + 42x^2 + 441x - 400 = 0$

C. $x^3 + 28x^2 + 245x - 650 = 0$

D. $x^3 - 28x^2 + 245x - 650 = 0$

Answer: 1

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58. If α, β, γ are the roots of $x^3 + 4x + 1 = 0$ then the equation whose roots are

$$\frac{\alpha^2}{\beta+\gamma}, \frac{\beta^2}{\gamma+\alpha}, \frac{\gamma^2}{\alpha+\beta}$$ is

A. $x^3 - 4x - 1 = 0$

B. $x^3 - 4x + 1 = 0$

C. $x^3 + 4x - 1 = 0$

D. $x^3 + 4x + 1 = 0$

Answer: 3

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59. If α, β, γ are the roots of $x^3 + x^2 + 2x + 3 = 0$ then the equation whose roots $\beta + \gamma, \gamma + \alpha, \alpha + \beta$ is

A. $x^3 + 2x^2 + 3x - 1 = 0$

B. $x^3 + 2x^2 + 3x + 1 = 0$

C. $x^3 + 2x^2 - 3x - 1 = 0$

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

Answer: 1

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60. If α, β, γ are the roots of $x^3 + 2x^2 - 3x + 4 = 0$ then the equation whose roots $\beta\gamma, \gamma\alpha, \alpha\beta$ is

A. $x^3 + 3x^2 + 8x + 16 + 0$

B. $x^3 + 3x^2 + 8x - 16 = 0$

C. $x^3 + 3x^2 - 8x - 16 = 0$

D. $x^3 - 3x^2 + 8x + 16 = 0$

Answer: 2

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61. If α, β, γ are the roots of $x^3 - 2x^2 + 3x + 5 = 0$ then the equation whose roots $\beta^2\gamma^2, \gamma^2\alpha^2, \alpha^2\beta^2$ is

A. $y^3 - 29y^2 - 50y - 625 = 0$

B. $2y^3 - 39y^2 - 70y + 125 = 0$

C. $y^4 - 24y^2 + 65y - 55 = 0$

D. $5y^5 - 12y^2 + 68y - 155 = 0$

Answer: 1

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62. If α, β, γ are the roots of $x^3 - 6x^2 + 11x - 6 = 0$ then find the equation whose roots are $\alpha^2 + \beta^2, \beta^2 + \gamma^2, \gamma^2 + \alpha^2$

A. $x^3 - 42x^2 + 441x - 400 = 0$

B. $x^3 + 42x^2 + 441x - 400 = 0$

C. $x^3 + 28x^2 + 245x - 650 = 0$

D. $x^3 - 28x^2 + 245x - 650 = 0$

Answer: 4

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63. If α, β, γ are the roots of $x^3 - 6x - 4 = 0$ then the equation whose roots are $\left(\beta\gamma + \frac{1}{\alpha}\right), \left(\gamma\alpha + \frac{1}{\beta}\right), \left(\alpha\beta + \frac{1}{\gamma}\right)$ is

A. $2x^3 + 4x^2 + 3x + 1 = 0$

B. $2x^3 + 4x^2 + 3x - 1 = 0$

C. $2x^2 + 4x^2 - 3x - 1 = 0$

D. $2x^3 - 4x^2 + 3x - 1 =$

Answer: 2

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64. If α, β, γ are the roots of $x^3 + 2x^2 - 5x + 3 = 0$ then the equation whose roots $\alpha - \frac{1}{\beta\gamma}, \beta - \frac{1}{\gamma\alpha}, \gamma - \frac{1}{\alpha\beta}$ is

A. $9x^3 + 8x^2 + 80x + 64 = 0$

B. $9x^3 + 8x^2 + 80x - 64 = 0$

C. $9x^3 + 8x^2 - 80x + 64 = 0$

D. $9x^2 - 8x^2 + 80x - 64 = 0$

Answer: 3

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65. If α, β, γ are the roots of $x^3 + 3px^2 + 3px + r = 0$ then the equation whose roots are $\alpha - \frac{1}{\beta\gamma}, \beta - \frac{1}{\gamma\alpha}, \gamma - \frac{1}{\alpha\beta}$ is

A. $y^3 - 29y^2 - 50y + 625 = 0$

B. $2y^3 - 36y^2 + 182y + 432 = 0$

C. $r^2y^3 + 3pr(r+1)y^2 + 3q(r+1)^2y + (r+1)^3 = 0$

D. $y^3 - q^2y^2 - 2qr^2y - r^4 = 0$

Answer: 3

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66. If α, β, γ are the roots of $x^3 + px^2 + qx + r = 0$, then form the cubic equation whose roots are $\alpha(\beta + \gamma), \beta(\gamma + \alpha), \gamma(\alpha + \beta)$

A. $x^3 + 2qx^2 + \left(q^2 + pr\right)x - r(pq - r) = 0$

B. $x^3 - 2qx^2 + \left(q^2 - pr\right)x - r(pq - r) = 0$

C. $x^3 + 2qx^2 + \left(q^2 - pr\right)x - r(pq - r) = 0$

D. $x^3 - 2px^2 + \left(q^2 + pr\right)x - r(pq - r) = 0$

Answer: 4

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67. If α, β, γ are the roots of the equation $x^3 + px^2 + qx + r = 0$ then the coefficient of x in cubic equation whose roots are $\alpha(\beta + \gamma), \beta(\gamma + \alpha)$ and $\gamma(\alpha + \beta)$ is

A. 2q

B. $q^2 + pr$

C. $p^2 - qr$

D. $r(pq - r)$

Answer: 2

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68. The roots of $4x^3 - 13x^2 - 13x + 4 = 0$ are

A. $-1, 4, 1/4$

B. 1,2,1/2

C. 1,4,1/4

D. $-1, 2, -\frac{1}{2}$

Answer: 1

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69. The roots of $2x^4 + x^3 - 6x^2 + x + 2 = 0$ are

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

B. $1, \frac{1 \pm \sqrt{3}i}{2}, \frac{3 \pm \sqrt{5}}{2}$

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

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

Answer: 1

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70. The roots of $x^4 - 10x^3 + 26x^2 - 10x + 1 = 0$ are

A. $3 \pm 2\sqrt{2}, 2 \pm \sqrt{3}$

B. $2 \pm 3\sqrt{2}, 2 \pm \sqrt{3}$

C. $3 \pm 2\sqrt{2}, 3 \pm \sqrt{2}$

D. $2 \pm 3\sqrt{2}, 3 \pm \sqrt{2}$

Answer: 1

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71. The roots of $x^4 - 12x^3 + 34x^2 - 12x + 1 = 0$ are

A. $2 \pm \sqrt{3}, 3 \pm 2\sqrt{2}$

B. $2 \pm \sqrt{3}, 4 \pm \sqrt{15}$

C. $-1, \ -2, \ -\frac{1}{2}, \frac{\sqrt{3 \pm \sqrt{5}}}{2}$

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

Answer: 2

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72. The roots of $6x^4 - 5x^3 - 38x^2 - 5x + 6 = 0$ are

A. 2, 1/2, 3, 1/3

B. $-2, \ -1/2, 3, 1/3$

C. 2, -1/2, -3, 1/3

D. $-2, 1/2, \ -3, 1/3$

Answer: 2

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73. The roots of $2x^5 + x^4 - 12x^3 - 12x^2 + x + 2 = 0$ are

A. $2 \pm \sqrt{3}, 3 \pm 2\sqrt{2}$

B. $\pm 1, 2, \frac{1}{2}, \frac{5 \pm \sqrt{11i}}{6}$

C. $-1, \ -2, \ -\frac{1}{2}, \frac{3 \pm \sqrt{5}}{2}$

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

Answer: 3

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74. solve $x^5 - 5x^4 + 9x^3 - 9x^2 + 5x - 1 = 0$

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

B. $1, \frac{1 \pm \sqrt{3}i}{2}, \frac{3 \pm \sqrt{5}}{2}$

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

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

Answer: 2

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75. The equation whose roots are reciprocals of the roots of $6x^6 - 25x^5 + 31x^4 - 31x^2$ + 25x - 6 = 0 ` is

A. $2 \pm \sqrt{3}, 3 \pm 2\sqrt{2}$

B. $\pm 1, 2, \frac{1}{2}, \frac{5 \pm \sqrt{11i}}{6}$

C. $-1, -2, -\frac{1}{2}, \frac{\sqrt{3 \pm \sqrt{5}}}{2}$

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

Answer: 2

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76. The equation whose roots are reciprocals of the roots of $6x^6 - 25x^5 + 31x^4 - 31x^2$ + 25x - 6 = 0 ` is

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

B. $1, \frac{1 \pm \sqrt{3}i}{2}, \frac{3 \pm \sqrt{5}}{2}$

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

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

Answer: 3

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Exercise 2 Special Type Questions Set 1

1. The equation whose roots are - 2, $3 \pm \sqrt{5}$ is

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: 3

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2. I: The roots of $4x^3 + 20x^2 - 23x + 6 = 0$ are 1, 2, -6.

II: The roots of $15x^3 - 23x^2 + 9x - 1 = 0$ are1, 1/3, 1/5 .

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: 2

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3. I: The condition that the roots of $x^3 - px^2 + qx - r = 0$ are such that the sum of two of the roots is 0 is pq = r .

II: The condition that $ax^4 + bx^3 + cx^2 + dx + e = 0$ may have a pair of equal roots is $ad^2 = b^2$e.

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: 3

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4. I: The equation whose roots are the squares of the roots of $x^3 - x^2 + 8x - 6 = 0$ is $x^3 + 15x^2 + 52x + 36 = 0$.

II: The equation whose roots are the cubes of the roots of $x^3 + 3x^2 + 2 = 0$ is $x^3 + 33x^2 + 12x + 8 = 0$.

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: 2

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5. I: The equation obtained by removing second term from $x^4 + 8x^3 + x - 5 = 0$ is $x^4 - 24x^2 + 65x - 55 = 0$.

II: The equation whose roots are exceed by 2 than those of $x^3 - 2x^2 + 3x - 1 = 0$ is $x^3 - 8x^2 + 23x - 23 = 0$.

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer: 3

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Set 2

1. If A, B, C are the remainders of $x^3 - 3x^2 - x + 5, 3x^4 - x^3 + 2x^2 - 2x - 4, 2x^5 - 3x^4 + 5x^3 - 7x^2 + 3x$ when divided by x + 1, x + 2, x - 2 respectively then the ascending order of A, B ,C is

A. A, B, C

B. B, C,A

C. A, C, B

D. B, A, C

Answer: 3

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2. If 1, -1, 3 are the roots of $x^3 + Ax^2 + Bx + C = 0$ then the ascending order of A, B, C is

A. A, B, C

B. B, C,A

C. A, C, B

D. B, A, C

Answer: 1

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3. If α, β, γ are the roots of $x^3 - x^2 + 33x + 5 = 0$ and A = $s_1, B = s_2, C = s_3$ then the dscending order of A, B, C is

A. A, B, C

B. B, C,A

C. A, C, B

D. B, A, C

Answer: 4

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4. If α, β, γ are the roots of the equation $x^3 - 6x^2 + 11x - 6 = 0$ and if a = $\alpha^2 + \beta^2 + \gamma^2$, b = $\alpha\beta + \beta\gamma + \gamma\alpha$ and c =$(\alpha + \beta)(\beta + \gamma)(\gamma + \alpha)$, then the correct inequality among the following is :

A. $a < b < c$

B. b $< a < c$

C. $b < c < a$

D. $c < a < b$

Answer: 2

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Set 3

1. Match the following.

Equation" Roobts

I $x^3 - 3x^2 - 16x + 48 = 0$ a) 6, 4, -1

II.$x^3 - 7x^2 + 14x - 8 = 0$ (b)1, 1/3, 1/5

III.$15x^3 - 23x^2 - 9x - 1 = 0$ (c) 1, 2, 4

IV$x^3 - 9x^2 + 14x + 24 = 0$ (d)4, -4, 3

A. c, d, a, b

B. d, c, b, a,

C. c, a , b, d

D. c, b, a, d

Answer: 2

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2. Match the following.

Roots of the equation	Equation
i. 2, 3, 6	$x^3 - 3x^2 - x + 3 = 0$
ii.$-2, 3, \pm\sqrt{5}$	$x^3 - 11x^2 + 36x - 36 = 0$

iii. 1, 3 $\pm 2i$ $x^3 - 4x^2 - 8x + 8 = 0$

iv 1,-1,3 $x^3 - 7x^2 + 19x - 13 = 0$

A. c, d, a, b

B. b,c,d,a

C. c, a , b, d

D. c, b, a, d

Answer: 2

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3. α, β, γ are the roots of the equation $x^3 - 10x^2 + 7x + 8 = 0$. Match the following and choose the correct answer.

i.$\alpha + \beta + \gamma$ (a) - 43/4

ii.$\alpha^2 + \beta^2 + \gamma^2$ (b) - 7/8

iii.$\frac{1}{\alpha} + \frac{1}{\beta} + \frac{1}{\gamma}$ (c) 86

iv. $\frac{\alpha}{\beta\gamma} + \frac{\beta}{\gamma\alpha} + \frac{\gamma}{\alpha\beta}$ (d) 10

(e)10

A. `e,c,a,b

B. d, c, b, a,

C. e,c,b,a

D. e,b,c,a

Answer: 3

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4. If α, β, γ are the roots of $x^3 - px^2 + qx - r = 0$ then match the following.

i. $\frac{1}{\alpha} + \frac{1}{\beta} + \frac{1}{\gamma}$	$(a)\frac{p^2 - 2q}{r^2}$
ii. $\frac{1}{\alpha\beta} + \frac{1}{\beta\gamma} + \frac{1}{\gamma\alpha} =$	$(b)\frac{q^2 - 2pr}{r^2}$
iii. $\frac{1}{a^2} + \frac{1}{\beta^2} + \frac{1}{\gamma^2} =$	$(c)\frac{p}{r}$
iv. $\frac{1}{\alpha^2\beta^2} + \frac{1}{\beta^2\gamma^2} + \frac{1}{\gamma^2\alpha^2} =$	$(d)\frac{q}{r}$

A. c, d, a, b

B. d, c, b, a,

C. c, a , b, d

D. c, b, a, d

Answer: 2

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5. Match the following

i. The equation whose roots are multiplied by 3 of (a)

$x^3 - 8x^2 + 19x - 15 = 0$

those of $x^3 + 2x^2 - 4x + 1 = 0$ is

ii.The equation whose roots are exceed by 1 than (b)

$x^3 + 5x^2 + 10x + 10 = 0$

those of $x^3 - 5x^2 + 6x - 3 = 0$ is

iii. The equation whose roots are diminish by 1 than (c)

$4x^4 - 2x^3 + 6x^2 - 3x - 1 = 0$

those of $x^3 + 2x^2 + 3x + 4 = 0$ is

iv. The equation whose roots are the reciprocals of the (d)

$x^3 + 6x^2 - 36x + 27 = 0$

roots of $x^4 + 3x^3 - 6x^2 + 2x - 4 = 0$ is

A. c, d, a, b

B. d, c, b, a,

C. c, a , b, d

D. c, b, a, d

Answer: 2

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Set 4

1. A : the equation whose roots are multiplied by 2 of those of $x^5 - 2x^4 + 3x^3 - 2x^2 + 4x + 3 = 0$ is $x^5 - 4x^4 + 12x^3 - 16x^2 + 64x + 96 = 0.$

R: the equation whose roots are multiplied by k of those of f(x) = 0 is f(x/k) = 0.

A. both A and R true and R is the correct explanation of A

B. both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: 1

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2. A: The equation whose roots are the reciprocals of the roots of $2x^3 + 7x^2 - 6x + 1 = 0$ is $x^3 - 6x^2 + 7x + 2 = 0$.

R: the equation whose roots are the reciprocals of those of f(x) = 0 is f(1/x) = 0.

A. both A and R true and R is the correct explanation of A

B. both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: 1

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3. A : the equation whose roots are exceed by 2 than those of $2x^3 + 3x^2 - 4x + 5 = 0$ is $2x^3 - 9x^2 + 8x + 9 = 0$

R : the equation whose roots are exceed by h than those of f(x) = 0 is f(x - h)= 0.

A. both A and R true and R is the correct explanation of A

B. both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: 1

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4. Assertion (A) : The equation whose roots are the squeares of the roots of $x^4 + x^3 + 2x^2 + x + 1 = 0$ is $x^4 + 3x^3 + 4x^2 + 3x + 1 = 0$

Reason (R) : the equation whose roots are the squares of the roots of f (x) =0 is obtained by eliminating squares root from $f\left(\sqrt{x}\right) = 0$

A. both A and R true and R is the correct explanation of A

B. both A and R are true but R is not correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: 1

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