MATHS

BOOKS - RS AGGARWAL MATHS (HINGLISH)

POLYNOMIALS

Solved Examples

1. Let $p(x) = x^2 - 2x - 3$. Find (i) $p(3)$ and (ii) $p(-1)$.

What do you conclude?

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2. Find the zeros of the polynomial $2x^2 + 5x - 12$ and verify

the relationship between its zeros and coefficients.

3. Find zeroes of the polynormial $6x^2 - 3 - 7x$

A. $x = \dfrac{5}{2}$ or $x = \dfrac{1}{3}$.

B. $x = \dfrac{3}{2}$ or $x = \dfrac{5}{3}$.

C. $x = \dfrac{3}{2}$ or $x = \dfrac{7}{3}$.

D. $x = \dfrac{3}{2}$ or $x = -\dfrac{1}{3}$

Answer: D

4. Find the zeros of the polynomial $f(x) = x^2 - 2$ and verify the relationship between its zeros and coefficients.

5. Obtain the zeros of the quadratic polynomial $\sqrt{3}x^2 - 8x + 4\sqrt{3}$ and verify the relation between its zeros and coefficients.

A. $7\sqrt{3}$ and $\dfrac{2}{\sqrt{7}}$.

B. $5\sqrt{3}$ and $\dfrac{4}{\sqrt{3}}$.

C. $2\sqrt{3}$ and $\dfrac{2}{\sqrt{3}}$.

D. $4\sqrt{5}$ and $\dfrac{2}{\sqrt{5}}$.

Answer: C

6. Find a quadratic polynomial, the sum and product of whose zeros are -5 and 6 respectively.

7. Find the quadratic polynomial, the sum of whose zeros is $\sqrt{2}$ and their product is -12. Hence, find the zeros of the polynomial.

8. If the product of the zero of the polynomial $\left(ax^2 - 6x - 6\right)$ is 4. Find the value of a.

A. $-\dfrac{7}{2}$

B. $-\dfrac{5}{2}$

C. $-\dfrac{3}{2}$

D. $-\dfrac{1}{2}$

Answer: C

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9. If one zero of the polynomial $\left(a^2 + 9\right)x^2 + 13x + 6a$ is the reciprocal of the other, find a

A. $a = 5$

B. $a = -3$

C. $a = 2$

D. $a = 3$

Answer: D

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10. Find a quadratic polynomial whose zeros are 1 and -3.

Verify the relation between the coefficients and zeros of the

polynomial.

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11. Verify that $3, \ -1$ and $-\dfrac{1}{3}$ are the zeros of the cubic polynomial $p(x) = 3x^3 - 5x^2 - 11x - 3$ and then verify the relationship between the zeros and its coefficients.

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12. Find a cubic polynomial with the sum, sum of the products of its zeros taken two at a time, and product of its zeros as $2, \ -7, \ -14$ respectively.

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13. If the zeros of the polynomial $f(x) = x^3 - 3x^2 + x + 1$ are $a - b, \ a, \ a + b$, find a and b.

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14. Find a cubic polynomial whose zeros are $3, \dfrac{1}{2}$ and -1.

15. Divide $3 - x + 2x^2$ by (2-x) and verify the division algorithm.

16. Divide $5x^3 - 13x^2 + 21x - 14$ by $(3 - 2x + x^2)$ and verify the division algorithm.

17. What real number should be subtracted from the polynomial $(3x^3 + 10x^2 - 14x - 9)$ so that $(3x - 2)$ divides it exactly?

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18. If the polynomial $(x^4 + 2x^3 + 8x^2 + 12x + 18)$ is divided by another polynomial $(x^2 + 5)$, the remainder comes out to be $(px + q)$. Find the values of p and q.

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19. On dividing $(x^3 - 3x^2 + x + 2)$ by a polynomial g(x), the quotient and remainder are $(x - 2)$ and $(-2x + 4)$ respectively. Find g(x).

20. It being given that 1 is a zero of the polynomial $\left(7x - x^3 - 6\right)$, find its other zeros.

A. -2 and 2

B. -3 and 2

C. -1 and 2

D. -4 and 2

Answer: B

21. Obtain all zeros of the polynomial $\left(2x^3 - 4x - x^2 + 2\right)$, if two of its zeros are $\sqrt{2}$ and $\left(-\sqrt{2}\right.$.

22. If two zeros of the polynomial $\left(x^4 - 6x^3 - 26x^2 + 138x - 35\right)$ are $\left(2 + \sqrt{3}\right)$ and $\left(2 - \sqrt{3}\right)$, find other zeros.

23. Obtain other zeros of $\left(3x^4 - 15x^3 + 13x^2 + 25x - 30\right)$, if two of its zeros are $\sqrt{\dfrac{5}{3}}$ and $-\sqrt{\dfrac{5}{3}}$.

A. $2, 4$

B. 2, 3

C. 3, 4

D. 2, 6

Answer: B

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Exercise 2 A

1. Find the zeros of the following quadratic polynomials and verify the relationship between the zeros and the coefficients: $x^2 + 7x + 12$

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2. Find the zeros of the following quadratic polynomials and verify the relationship between the zeros and the coefficients:

$$x^2 - 2x - 8$$

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3. Find the zeros of the following quadratic polynomials and verify the relationship between the zeros and the coefficients:

$$x^2 + 3x - 10$$

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4. Find the zeros of the following quadratic polynomials and verify the relationship between the zeros and the coefficients:

$4x^2 - 4x - 3$

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5. Find the zeros of the following quadratic polynomials and verify the relationship between the zeros and the coefficients:

$5x^2 - 4 - 8x$

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6. Find the zeros of the following quadratic polynomials and verify the relationship between the zeros and the coefficients:

$2\sqrt{3}x^2 - 5x + \sqrt{3}$

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7. Find the zeros of the following quadratic polynomials and verify the relationship between the zeros and the coefficients:

$2x^2 - 11x + 15$

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8. Find the zeros of the following quadratic polynomials and verify the relationship between the zeros and the coefficients:

$$4x^2 - 4x + 1$$

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9. Find the zeros of the following quadratic polynomials and verify the relationship between the zeros and the coefficients:

$$x^2 - 5$$

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10. Find the zeros of the following quadratic polynomials and verify the relationship between the zeros and the coefficients:

$$8x^2 - 4$$

11. Find the zeros of the following quadratic polynomials and verify the relationship between the zeros and the coefficients:

$$5y^2 + 10y$$

12. Find the zeros of the following quadratic polynomials and verify the relationship between the zeros and the coefficients:

$$3x^2 - x - 4$$

13. Find the quadratic polynomial whose zeros are 2 and -6.verify the relation between the coefficients and the zeros of the polynomial.

14. Find the quadratic polynomial whose zeros are $\frac{2}{3}$ and $\frac{-1}{4}$. Verify the relation between the coefficients

and the zeros of the polynomial.

15. Find the quadratic polynomial, sum of whose zeros is 8 and their product is 12. Hence, find the zeros of the polynomial.

A. 6, 2

B. 5, 2

C. 4, 2

D. 7, 2

Answer: A

16. Find the quadratic polynomial, the sum of whose zeros is 0 and their product is -1. Hence, find the zeros of the polynomial.

17. Find the quadratic polynomial, the sum of whose zeros is $\left(\dfrac{5}{2}\right)$ and their product is 1. Hence, find the zeros of the polynomial.

18. Find the quadratic polynomial, the sum of whose roots is $\sqrt{2}$ and their product is $\dfrac{1}{3}$.

19. If $x = \dfrac{2}{3}$ and $x = -3$ are the roots of the quadratic equation $ax^2 + 7x + b = 0$ then find the values of a and b.

20. If x+a is a factor of $2x^2 + 2ax + 5x + 10$, find the value of a.

21. One zero of the polynomial $3x^3 + 16x^2 + 15x - 18$ is $\dfrac{2}{3}$. Find the other zeroes of the polynomial.

1. Verify that $3, \; -2, 1$ are the zeros of the cubic polynomial $p(x) = x^3 - 2x^2 - 5x + 6$ and verify the relation between its zeros and coefficient.

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2. Verify that $5, \; -2$ and $\dfrac{1}{3}$ are the zeros of the cubic polynomial $p(x) = 3x^3 - 10x^2 - 27x + 10$ and verify the relation between its zeros and coefficients.

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3. Find a cubic polynomial whose zeros are $2, \ -3$ and $4.$

A. $x^3 - 3x^2 - 10x + 24$

B. $x^3 - 3x^2 - 10x - 24$

C. $x^3 + 3x^2 - 10x + 24$

D. $x^3 - 3x^2 + 10x + 24$

Answer: A

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4. Find a cubic polynomial whose zeros are $\dfrac{1}{2}, 1$ and $-3.$

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5. Find a cubic polymial with the sum, sum of the product of its zeros taken two at a time , and the product of its zeros as $5, \; -2$ and -24 respectively.

6. Apply the division algorithm to find the quotient and remainder on dividing $f(x) = x^3 - 3x^2 + 5x - 3$ by $g(x) = x^2 - 2$

7. Divide the polynomial $p(x) = x^4 - 3x^2 + 4x + 5$ by the polynomial $g(x) = x^2 - x + 1$ and find quotient and remainder.

8. Apply the division algorithm to find the quotient and remainder on dividing $f(x) = x^4 - 5x + 6$ by $g(x) = 2 - x^2$

9. Find the quotient and the remainder when

By actual division , show that $x^2 - 3$ is a factor of $2x^4 + 3x^3 - 2x^2 - 9x - 12.$

10. On dividing $3x^3 + x^2 + 2x + 6$ by a polynomial g(x), the quotient and remainder are (3x-5) and (3x+21) respectively. Find g(x).

11. Verify division algorithm for the polynomials $f(x) = 8 + 20x + x^2 - 6x^3$ and $g(x) = 2 + 5x - 3x^2$

12. Find the quotient and the remainder when

It is given that -1 is one of the zeros of the polynomial $x^3 + 2x^2 - 11x - 12$.

Find all the zeros of the given polynomial.

13. Find the quotient and the remainder when

If 1 and -2 are two zeros of the polynomial $(x^3 - 4x^2 - 7x + 10)$, find its third zero.

14. Find the quotient and the remainder when

If 3 and -3 are two zeros of the polynomial $(x^4 + x^3 - 11x^2 - 9x + 18)$, find all the zeros of the given polynomial.

15. Find all the zeros of the polynomial $x^4 + x^3 - 34x^2 - 4x + 120$

16. Find the quotient and the remainder when

Find all the zeros of $(x^4 + x^3 - 23x^2 - 3x + 60)$, if it is given that two of its zeros are $\sqrt{3}$ and $-\sqrt{3}$.

17. Find the quotient and the remainder when

Find all the zeros of $(2x^4 - 3x^3 - 5x^2 + 9x - 3)$, it being given that two of its zeros are $\sqrt{3}$ and $-\sqrt{3}$.

18. Obtain all other zeros of $x^4 + 4x^3 - 2x^2 - 20x - 15$ if two of its zeros are $\sqrt{5}$ and $-\sqrt{5}$

19. Find the quotient and the remainder when

Find all the zeros of the polynomial $\left(2x^4 - 11x^3 + 7x^2 + 13x - 7\right)$, it being given that two its zeros are $\left(3 + \sqrt{2}\right)$ and $\left(3 - \sqrt{2}\right)$.

Exercise 2 C

1. If one zero of the polynomial $x^3 - 4x + 1$ is $2 + \sqrt{3}$ write the other zero

2. Find the zeros of the polynomial $x^2 + x - p(p + 1)$.

3. Find the zeros of the polynomial $x^2 - 3x = m(m + 3)$.

4. If α, β are the zeros of the polynomial such that $\alpha + \beta = -6$ and $\alpha\beta = -4$, then write the polynomial.

5. If one zero of the quadratic polynomial $kx^2 + 3x + k$ is 2 then the value of k is

6. If 3 is a zero of the polynomial $2x^2 + x + k$, find the value of k.

7. If -4 is a zero of the polynomial $x^2 - x - (2k + 2)$, then find the value of k.

A. $k = 9$

B. $k = -9$

C. $k = 2$

D. None

Answer: A

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8. If 1 is a zero of the polynomial $ax^2 - 3(a-1)x - 1$, then find the value of a.

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9. If -2 is a zero of the polynomial $3x^2 + 4x + 2k$ then find the value of k.

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10. Write the zeros of the polynomial $x^2 - x - 6$.

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11. If the sum of the zeros of the quadratic polynomial $f(x) = kx^2 - 3x + 5$ is 1, write the value of k .

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12. If the product of zeros of the quadratic polynomial $f(x) = x^2 - 4x + k$ is 3, find the value of k.

13. If $(x + a)$ is a factor of $2x^2 + 2ax + 5x + 10$, find a.

14. If (a-b), a and (a+b) are zeros of the polynomial $2x^3 - 6x^2 + 5x - 7$, write the value of a.

15. If $f(x) = x^3 + x^2 - ax + b$ is divisible by $x^2 - x$ write the values of a and b.

    A. $a = 2$ and -2

    B. $a = 2$ and 0

    C. $a = 0$ and -2

    D. $a = 2$ and -3

Answer: B

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16. If $alpah$ and β are the zeros of the polynomial $2x^2 + 7x + 5$, write the value of $\alpha + \beta + \alpha\beta$.

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17. State division algorithm for polynomials.

18. The sum and product of the zeros of a quadratic polynomial are $-\dfrac{1}{2}$ and -3 respectively. What is the quadratic polynomial.

A. $x^2 + \dfrac{1}{2}x + 3$

B. $x^2 + \dfrac{1}{7}x - 3$

C. $x^2 + \dfrac{1}{2}x - 3$

D. $x^2 - \dfrac{1}{2}x - 3$

Answer: C

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19. Find the zeros of the quadratic polynomial $f(x) = 6x^2 - 3$, and verify the relation-ship between the zeros and its coefficients:

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20. Write zeros of the polynomial $p(x) = 4\sqrt{3}x^2 + 5x - 2\sqrt{3}$

A. $x = \dfrac{-2}{\sqrt{3}}$ or $x = \dfrac{\sqrt{5}}{4}$

B. $x = \dfrac{2}{\sqrt{3}}$ or $x = \dfrac{\sqrt{3}}{4}$

C. $x = \dfrac{-2}{\sqrt{3}}$ or $x = \dfrac{\sqrt{3}}{4}$

D. None of the above

Answer: C

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21. If α and β ar the zeros of the polynomial $f(x) = x^2 - 5x + k$ such that $\alpha - \beta = 1$, find the value of k

A. 6

B. 5

C. 4

D. 3

Answer: A

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22. If α and β are the zeros of the quadratic polynomial $f(x) = 6x^2 + x - 2$, find the value of $\dfrac{\alpha}{\beta} + \dfrac{\beta}{\alpha}$.

A. $\dfrac{25}{12}$

B. $\dfrac{-25}{11}$

C. $\dfrac{-25}{12}$

D. none of these

Answer: C

23. If α and β are the zeros of the polynomial $f(x) = 5x^2 - 7x + 1$, find the value of $\left(\dfrac{1}{\alpha} + \dfrac{1}{\beta} \right)$.

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24. If α and β are the zeros of the quadratic polynomial $f(x) = x^2 + x - 2$, find the value of $\dfrac{1}{\alpha} - \dfrac{1}{\beta}$

A. $-\dfrac{2}{3}$

B. $-\dfrac{3}{2}$

C. $\dfrac{3}{2}$

D. $\dfrac{2}{3}$

Answer: B

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25. If the zeros of the polynomial $f(x) = x^3 - 3x^2 + x + 1$ are $a - b, \ a, \ a + b,$ find a and b.

A. $a = 1$ and $b = \pm \sqrt{3}$

B. $a = 2$ and $b = \pm \sqrt{2}$

C. $a = 1$ and $b = \sqrt{2}$

D. $a = 1$ and $b = \pm \sqrt{2}$

Answer: D

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Multiple Choice Questions Mcq

1. which one of the following is a polynomial ?

A. $x^2 - 5x + 4\sqrt{x} + 3$

B. $x^{3/2} - x + x^{1/2} + 1$

C. $\sqrt{x} + \dfrac{1}{\sqrt{x}}$

D. $\sqrt{2}x^2 - 3\sqrt{3}x + \sqrt{6}$

Answer: D

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2. Which of the following is not a polynomial?

A. $\sqrt{3}x^2 - 2\sqrt{3}x + 5$

B. $9x^2 - 4x + \sqrt{2}$

C. $\dfrac{2}{2}x^3 + 6x^2 - \dfrac{1}{\sqrt{2}}x - 8$

D. $x + \dfrac{3}{x}$

Answer: D

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3. The zeros of the polynomial $x^2 - 2x - 3$ are

A. $-3, 1$

B. $-3, \ -1$

C. $3, \ -1$

D. $3, 1$

Answer: C

4. The zeros of the polynomial $x^2 - \sqrt{2}x - 12$ are

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

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

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

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

Answer: B

5. The zeros of the polynomial $4x^2 + 5\sqrt{2}x - 3$ are :

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

B. $-3\sqrt{2}, \dfrac{\sqrt{2}}{2}$

C. $\dfrac{-3\sqrt{2}}{2}, \dfrac{\sqrt{2}}{4}$

D. none of these

Answer: C

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6. The zeros of the polynomial $x^2 + \dfrac{1}{6}x - 2$ are

A. $-3, 4$

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

C. $\dfrac{-4}{3}, \dfrac{3}{2}$

D. none of these

Answer: B

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7. The zeros of the polynomial $7x^2 - \dfrac{11x}{3} - \dfrac{2}{3}$ are

A. $\dfrac{2}{3}, \dfrac{-1}{7}$

B. $\dfrac{-2}{3}, \dfrac{-1}{3}$

C. $\dfrac{-2}{3}, \dfrac{1}{7}$

D. none of these

Answer: A

8. The sum and the product of the zeros of a quadratic polynomial are 3 and -10 respectively. The quadratic polynomial is

    A. $x^2 - 3x + 10$

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

    C. $x^2 - 3x - 10$

    D. $x^2 + 3x + 10$

Answer: C

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9. A quadratic polynomial whose zeros are 5 and -3, is

A. $x^2 + 2x - 15$

B. $x^2 - 2x + 15$

C. $x^2 - 2x - 15$

D. none of these

Answer: C

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10. A quadratic polynomial whose zeros are $\dfrac{3}{5}$ and $\dfrac{-1}{2}$, is

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

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

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

D. $10x^2 - x - 3$

Answer: D

11. The zeros of the quadratic polynomial $x^2 + 88x + 125$ are

    A. both positive

    B. both negative

    C. one positive and one negative

    D. both equal

Answer: B

12. If α and β are the zeros of $x^2 + 5x + 8$ then the value of $(\alpha + \beta)$ is

A. 5

B. -5

C. 8

D. -8

Answer: B

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13. If α and β are the zeros of $2x^2 + 5x - 9$ then the value of $\alpha\beta$ is

A. $\dfrac{-5}{2}$

B. $\dfrac{5}{2}$

C. $\dfrac{-9}{2}$

D. $\dfrac{9}{2}$

Answer: C

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14. If one zero of the quadratic polynomial $kx^2 + 3x + k$ is 2

then the value of k is

A. $\dfrac{5}{6}$

B. $\dfrac{-5}{6}$

C. $\dfrac{6}{5}$

D. $\dfrac{-6}{5}$

Answer: D

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15. If one zero of the quadratic polynomial $(k-1)x^2 + kx + 1$ is -4 then the value of k is

A. $\dfrac{-5}{4}$

B. $\dfrac{5}{4}$

C. $\dfrac{-4}{3}$

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

Answer: B

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16. If -2 and 3 are the zeros of the quadratic polynomial

$x^2 + (a+1)x + b$ then

A. $a = -2, b = 6$

B. $a = 2, b = -6$

C. $a = -2, b = -6$

D. $a = 2, b = 6$

Answer: C

17. If one zero of $3x^2 + 8x + k$ be the reciprocal of the other

then k = ?

   A. 3

   B. -3

   C. $\dfrac{1}{3}$

   D. $\dfrac{-1}{3}$

Answer: A

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18. If the sum of the zeros of the quadratic polynomial

$kx^2 + 2x + 3k$ is equal to the product of its zeros then

$k = ?$

A. $\dfrac{1}{3}$

B. $\dfrac{-1}{3}$

C. $\dfrac{2}{3}$

D. $\dfrac{-2}{3}$

Answer: D

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19. If α, β are the zeros of the polynomial $x^2 + 6x + 2$ then $\left(\dfrac{1}{\alpha} + \dfrac{1}{\beta}\right) = ?$

A. 3

B. -3

C. 12

D. -12

Answer: B

20. If α, β, γ are the zeros of the polynomial $x^3 - 6x^2 - x + 30$ then $(\alpha\beta + \beta\gamma + \gamma\alpha)=$?

A. -1

B. 1

C. -5

D. 30

Answer: A

21. If α, β, γ are the zeros of the polynomial $2x^3 + x^2 - 13x + 6$ then $\alpha\beta\gamma$= ?

A. -3

B. 3

C. $\dfrac{-1}{2}$

D. $\dfrac{-13}{2}$

Answer: A

22. If α, β, γ be the zeros of the polynomial p(x) such that $(\alpha + \beta + \gamma) = 3, (\alpha\beta + \beta\gamma + \gamma\alpha) = -10$ and $\alpha\beta\gamma = -24$ then p(x) = ?

A. $x^3 + 3x^2 - 10x + 24$

B. $x^3 + 3x^2 + 10x - 24$

C. $x^3 - 3x^2 - 10x + 24$

D. none of these

Answer: C

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23. If two of the zeros of the cubic polynomial $ax^3 + bx^2 + cx + d$ are 0 then the third zero is

A. $\dfrac{-b}{a}$

B. $\dfrac{b}{a}$

C. $\dfrac{c}{a}$

D. $\dfrac{-d}{a}$

Answer: A

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24. If one of the zeroes of the cubic polynomial $ax^3 + bx^2 + cx + d$ is zero, the product of the other two zeroes is :

A. $\dfrac{-c}{a}$

B. $\dfrac{c}{a}$

C. 0

D. $\dfrac{-b}{a}$

Answer: B

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25. If one of the zeroes of the cubic polynomial $x^3 + ax^2 + bx + c$ is -1,then find the product of other two zeroes.

A. $a - b - 1$

B. $b - a - 1$

C. $1 - a + b$

D. $1 + a - b$

Answer: C

26. If α, β be the zeros of the polynomial $2x^2 + 5x + k$ such that $\alpha^2 + \beta^2 + \alpha\beta = \dfrac{21}{4}$ then k= ?

A. 3

B. -3

C. -2

D. 2

Answer: D

27. On dividing a polynomial $p(x)$ by a non-zero polynomial $q(x)$, let $g(x)$ be the quotient and $r(x)$ be the remainder then $= q(x) \cdot g(x) + r(x)$, where

  A. $r(x) = 0$ always

  B. deg $r(x) >$ deg $q(x)$ always

  C. either $r(x) = 0$ or deg $r(x) <$ deg $q(x)$

  D. $r(x) = g(x)$

Answer: C

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28. Which of the following is a true statement ?

A. $x^2 + 5x - 3$ is a linear polynomial.

B. $x^2 + 4x - 1$ is a binomial.

C. $x + 1$ is a monomial.

D. $5x^3$ is a monomial.

Answer: D

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Test Yourself

1. Zeros of $p(x) = x^2 - 2x - 3$ are

A. $1, \ -3$

B. $3, \ -1$

C. $-3,\ -1$

D. $1,\ 3$

Answer: B

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2. If α, β, γ are the zeros of the polynomial $x^3 - 6x^2 - x + 30$ then the value of $(\alpha\beta + \beta\gamma + \gamma\alpha)$ is

A. -1

B. 1

C. -5

D. 30

Answer: A

3. If α, β are the zeros of $kx^2 - 2x + 3k$ such that $\alpha + \beta = \alpha\beta$ then $k = ?$

A. $\dfrac{1}{3}$

B. $\dfrac{-1}{3}$

C. $\dfrac{2}{3}$

D. $\dfrac{-2}{3}$

Answer: C

4. It is given that the difference between the zeros of $4x^2 - 8kx + 9$ is 4 and $k > 0$. Then, k = ?

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

B. $\dfrac{3}{2}$

C. $\dfrac{5}{2}$

D. $\dfrac{7}{2}$

Answer: C

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5. Find the zeros of the polynomial $x^2 + 2x - 195$.

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6. 021 If one zero of the polynomial $(a^2 + 9)x^2 + 13x + 6a$

is the reciprocal of the other, find a

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7. Find a quadratic polynomial whose zeros are 2 and -5.

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8. If the zeros of the polynomial $f(x) = x^3 - 3x^2 + x + 1$

are $a - b, \ a, \ a + b,$ find a and b.

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9. Verify that 2 is a zero of the polynomial $x^3 + 4x^2 - 3x - 18$.

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10. Find a quadratic polynomial, the sum and product of whose zeros are -5 and 6 respectively.

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11. Find a cubic polynomial whose zeros are 3, 5 and -2.

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12. Using remainder theorem, find the remainder when $p(x) = x^3 + 3x^2 - 5x + 4$ is divided by (x-2).

13. Show that (x+2) is a factor of $f(x) = x^3 + 5 = 4x^2 + x - 6$.

14. If α, β, γ are the zeros of the polynomial $p(x) = 6x^3 + 3x^2 - 5x + 1$, find the value of $\left(\frac{1}{\alpha} + \frac{1}{\beta} + \frac{1}{\gamma}\right)$.

A. 5

B. 6

C. 3

D. 1

Answer: A

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15. If α and β are the zeros of the polynomial $f(x) = x^2 - 5x + k$ such that $\alpha - \beta = 1$, find the value of k

A. $k = 0$

B. $k = 6$

C. $k = 3$

D. $k = 10$

Answer: B

16. Show that the polynomial $f(x) = x^4 + 4x^2 + 6$ has no zero.

17. If one zero of the polynomial $p(x) = x^3 - 6x^2 + 11x - 6$ is 3, find the other two zeros.

18. Find all the zeros of the polynomial $f(x) = 2x^4 - 3x^3 - 3x^2 + 6x - 2$, if two of its zeros are $\sqrt{2}$ and $-\sqrt{2}$.

A. 1, $\dfrac{1}{2}$

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

C. 2, $\dfrac{\sqrt{1}}{2}$

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

Answer: A

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19. Find the quotient when $p(x) = 3x^4 + 5x^3 - 7x^2 + 2x + 2$ is divided by

$$\left(x^2 + 3x + 1\right).$$

20. If the remainder on division of $x^3 + 2x^2 + kx + 3$ by $x - 3$ is 21, then find the quotient and the value of k. Hence, find the zeroes of the cubic polynomial $x^3 + 2x^2 + kx - 18.$

A. $k = -9$

B. $k = -9$

C. $k = -6$

D. $k = -5$

Answer: B