MATHS

BOOKS - SURA MATHS (TAMIL ENGLISH)

ALGEBRA

Exercise 3 1

1. Which of the following expressions are polynomials. If not give reason :

$$\frac{1}{x^2} + 3x - 4$$

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2. Which of the following expressions are polynomials. If not give reason :

$x^2(x-1)$

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3. Which of the following expressions are polynomials. If not give reason :

$\frac{1}{x}(x+5)$

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4. Which of the following expressions are polynomials. If not give reason :

$$\frac{1}{x^{-2}} + \frac{1}{x^{-1}} + 7$$

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5. Which of the following expressions are polynomials. If not give reason :

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

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6. Which of the following expressions are polynomials. If not give reason :

$m^2 - \sqrt[3]{m} + 7m - 10$

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7. Write the coefficient of x^2 and x is each of the following polynomials.

$4 + \frac{2}{5}x^2 - 3x$

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8. Write the coefficient of x^2 and x is each of the following polynomials.

$6 - 2x^2 + 3x^3 - \sqrt{7}x$

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9. Write the coefficient of x^2 and x is each of the following polynomials.

$\pi x^2 - x + 2$

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10. Write the coefficient of x^2 and x is each of the following polynomials.

$\sqrt{3}x^2 + \sqrt{2}x + 0.5$

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11. Write the coefficient of x^2 and x is each of the following polynomials.

$x^2 - \frac{7}{2}x + 8$

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12. Find the degree of the following polynomials.

$1 - \sqrt{2}y^2 + y^7$

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13. Find the degree of the following polynomials.

$$\frac{x^3 - x^4 + 6x^6}{x^2}$$

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14. Find the degree of the following polynomials.

$x^3(x^2 + x)$

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15. Find the degree of the following polynomials.

$3x^4 + 9x^2 + 27x^6$

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16. Find the degree of the following polynomials.

$2\sqrt{5}p^4 - \frac{8p^3}{\sqrt{3}} + \frac{2p^2}{7}$

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17. Rewrite the following polynimials in standard form.

$x - 9 + \sqrt{7}x^3 + 6x^2$

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18. Rewrite the following polynimials in standard form.

$\sqrt{2}x^2 - \frac{7}{2}x^4 + x - 5x^3$

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19. Rewrite the following polynimials in standard form.

$$.7x^3 - \frac{6}{5}x^2 + 4x - 1$$

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20. Rewrite the following polynimials in standard form.

$$y^2 + \sqrt{5}y^3 - 11 - \frac{7}{3}y + 9y^4$$

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21. Add the following polynomials and find the degree of the resultant polynomial.

(i) $p(x) = 6x^2 - 7x + 2$

$q(x) = 6x^3 - 7x + 15$

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22. Add the following polynomials and find the degree of the resultant polynomial.

(ii) $h(x) = 7x^3 - 6x + 1$

$f(x) = 7x^2 + 17x - 9$

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23. Add the following polynomials and find the degree of the resultant polynomial.

(iii) $f(x) = 16x^4 - 5x^2 + 9$

$g(x) = -6x^3 + 7x - 15$

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24. Subtract the second polynomial from the first polynomials and find the degree of the resultant polynomial.

$p(x) = 7x^2 + 6x - 1\ q(x) = 6x - 9$

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25. Subtract the second polynomial from the first polynomials and find the degree of the resultant polynomial.

$f(y) = 6y^2 - 7y + 2\ g(y) = 7y + y^3$

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26. Subtract the second polynomial from the first polynomials and find the degree of the resultant polynomial.

$h(z) = z^5 - 6z^4 + z\ f(z) = 6z^2 + 10z - 7$

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27. What should be added to $2x^3 + 6x^2 - 5x + 8$ to get $3x^3 - 2x^2 + 6x + 15$?

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28. What must be subtracted from $2x^4 + 4x^2 - 3x + 7$ to get $3x^3 - x^2 + 2x + 1$?

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29. Multiple the following polynomials and find the degree of the resultant polynomials ?

$p(x) = x^2 - 9\, q(x) = 6x^2 + 7x - 2$

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30. Multiple the following polynomials and find the degree of the resultant polynomials ?

$f(x) = 7x + 2\, g(x) = 15x - 9$

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31. Multiple the following polynomials and find the degree of the resultant polynomials ?

$h(x) = 6x^2 - 7x + 1\, f(x) = 5x - 7$

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32. The cost of a chocolate is Rs. $(x + y)$ and Amir bought $(x + y)$ chocolates. Find the total amount paid by him in terms of x and y. If x = 10, y = 5 find the amount paid by him.

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33. The length of a rectangle is $(3x + 2)$ units and it's breadth is $(3x - 2)$ units. Find its area in terms of x. What will be the area if x = 20 units.

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34. p(x) is a polynomial of degree 1 and q(x) is a polynomial of degree 2. What kind of the polynomial $p(x) \times q(x)$ is ?

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Exercise 3 2

1. Find the value of the polynomial $f(y) = 6y - 3y^2 + 3$ at (i) y = 1 (ii) y = -1 (iii) y = 0

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2. If $p(x) = x^2 - 2\sqrt{2}x + 1$, find $p\left(2\sqrt{2}\right)$

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3. Find the zeros of the polynomial in each of the following :

$p(x) = x - 3$

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4. Find the zeros of the polynomial in each of the following :

$p(x) = 2x + 5$

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5. Find the zeros of the polynomial in each of the following :

$q(y) = 2y - 3$

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6. Find the zeros of the polynomial in each of the following :

$f(z) = 8z$

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7. Find the zeros of the polynomial in each of the following :

$p(x)ax$ where $a \neq 0$

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8. Find the zeros of the polynomial in each of the following :

$h(x) = ax + b, a \neq 0, a, b \in R$

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9. Find the roots of the polynomial equations.

$5x - 6 = 0$

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10. Find the roots of the polynomial equations.

$x + 3 = 0$

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11. Find the roots of the polynomial equations.

$10x + 9 = 0$

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12. Find the roots of the polynomial equations.

$9x - 4 = 0$

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13. Verify whether the following are zeros of the polynomial indicated against them, or not.

$p(x) = 2x - 1, x = \frac{1}{2}$

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14. Verify whether the following are zeros of the polynomial indicated against them, or not.

$p(x) = x^3 - 1, x = 1$

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15. Verify whether the following are zeros of the polynomial indicated against them, or not.

$p(x) = ax + b, x = \frac{-b}{a}$

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16. Verify whether the following are zeros of the polynomial indicated against them, or not.

$p(x) = (x + 3)(x - 4), x = 4, x = -3$

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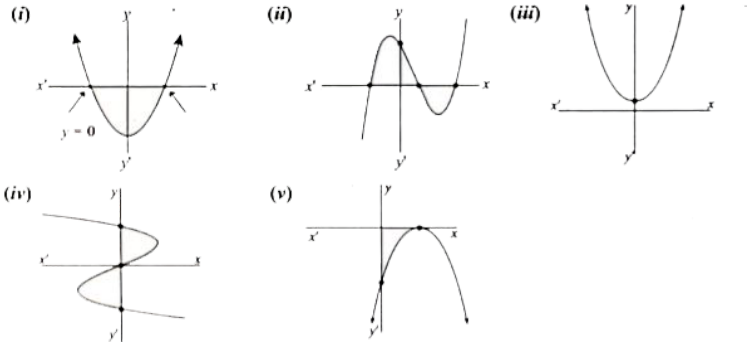
17. Find the number of zeros of the following polynomials represented by their graph ,



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18. If $p(x) = 5x^3 - 3x^2 + 7x - 9$, find (i) p(-1) (ii) p(2)

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19. Find the zeros of the following polynomials.

$p(x) = 2x - 3$

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20. Find the zeros of the following polynomials.

$p(x) = x - 2$

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Exercise 3 3

1. Check whether p(x) is a multiple of g(x) or not.

$p(x) = x^3 - 5x^2 + 4x - 3, g(x) = x - 2$

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2. By remainder theorem, find the remainder when,

p(x) is divided by g(x) where,

$p(x) = x^3 - 2x^2 - 4x - 1, g(x) = x + 1$

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3. By remainder theorem, find the remainder when, p(x) is divided by g(x) where,

$p(x) = 4x^3 - 12x^2 + 14x - 3, g(x) = 2x - 1$

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4. By remainder theorem, find the remainder when, p(x) is divided by g(x) where,

$p(x) = x^3 - 3x^2 + 4x + 50, g(x) = x - 3$

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5. Find the remainder when $3x^3 - 4x^2 + 7x - 5$ is dividend by $(x + 3)$

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6. What is the remainder when $x^{2018} + 2018$ is divided by x-1 .

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7. For what value of k is the polynomial $p(x) = 2x^3 - kx^2 + 3x + 10$ exactly divisible by (

x-2).

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8. If two polynomials $2x^3 + ax^2 + 4x - 12$ and $x^3 + x^2 - 2x + a$leave the same remainder when divided by (x-3) , find the value of a. and also find the remainder.

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9. Determine whether $(x - 1)$ is a factor of the following polynomials :

$x^3 + 5x^2 - 10x + 4$

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10. Determine whether $(x - 1)$ is a factor of the following polynomials :

$x^4 + 5x^2 - 5x + 1$

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11. Using factor theorem, show that (x-5) is a factor of the polynomial $2x^3 - 5x^2 - 28x + 15$

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12. Determine the value of m, if $(x+3)$ is a factor of

$x^3 - 3x^2 - mx + 24$

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13. If both (x-2) and $\left(x - \frac{1}{2}\right)$ are the factors of

$ax^2 + 5x + b$, then show that a =b .

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14. If (x-1) divides the polynomial $kx^3 - 2x^2 + 25x - 26$ without remainder , then find the value of k.

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15. Check if $(x + 2)$ and $(x - 4)$ are the sides of a rectangle whose area is $x^2 - 2x - 8$ by using factor theorem.

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16. Find the remainder using remainder theorem , when

$4x^3 - 5x^2 + 6x - 2$ is divided by x-1

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17. Find the remainder using remainder theorem , when

$x^3 - 7x^2 - x + 6$ is divided by $x + 2$

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18. Find the value of a if $2x^3 - 6x^2 + 5ax - 9$ leaves the remainder 13 when it is divided by x -2 .

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19. If the polynomials $f(x) = ax^3 + 4x^2 + 3x - 4$ and $g(x) = x^3 - 4x + a$ leave the same remainder when divided by x-3 . Find the value of a. Also find the remainder.

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20. Show that $x+4$ is a factor of $x^3+6x^2-7x-60$

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21. In $(5x+4)$ a factor of $5x^3+14x^2-32x-32$

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22. Find the value of k, if (x -3) is a factor of polynomials $x^3-9x^2+26x+k$

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23. Show that (x- 3) is a factor of

$x^3 + 9x^2 - x - 105$

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24. Show that $(x + 2)$ is a factor of

$x^3 - 4x^2 - 2x + 20$

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Exercise 3 4

1. Expand the following :

$(2x + 3y + 4z)^2$

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2. Expand the following :

$(-p + 2q + 3r)^2$

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3. Expand the following :

$(2p + 3)(2p - 4)(2p - 5)$

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4. Expand the following :

$(3a+1)(3a-2)(3a+4)$

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5. Using algebraic identity, find the coefficient of x^2, x and constant term without actual expansion.

$(x+5)(x+6)(x+7)$

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6. Using algebraic identity, find the coefficient of x^2, x and constant term without actual expansion.

$(2x+3)(2x-5)(2x-6)$

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7. If

$(x+a)(x+b)(x+c) = x^3 + 14x^2 + 59x + 70,$

find the value of

$a+b+c$

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8. If

$$(x+a)(x+b)(x+c) = x^3 + 14x^2 + 59x + 70,$$

find the value of

$$\frac{1}{a} + \frac{1}{b} + \frac{1}{c}$$

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9. If

$$(x+a)(x+b)(x+c) = x^3 + 14x^2 + 59x + 70,$$

find the value of

$$a^2 + b^2 + c^2$$

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10. If

$$(x+a)(x+b)(x+c) = x^3 + 14x^2 + 59x + 70,$$

find the value of

$$\frac{a}{bc} + \frac{b}{ac} + \frac{c}{ab}$$

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11. Expand

$$(3a - 4b)^3$$

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12. Expand

$$\left(x+\frac{1}{y}\right)^3$$

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13. Evaluate the following by using identities :

98^3

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14. Evaluate the following by using identities :

1001^3

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15. If $(x+y+z)=9$ and $(xy+yz+zx)=26$ then find the value of $x^2+y^2z^2$

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16. Find $27a^3+64b^3$, if $3a+4b=10$ and ab = 2

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17. Find x^3-y^3, find $x-y=5$ and xy = 14

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18. If $a + \frac{1}{a} = 6$, then find the value of $a^3 + \frac{1}{a^3}$

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19. If $x^2 + \frac{1}{x^2} = 23$, then find the value of $x + \frac{1}{x}$ and $x^3 + \frac{1}{x^3}$

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20. If $\left(y - \frac{1}{y}\right)^3 = 27$, then find the value of $y^3 - \frac{1}{y^3}$

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21. Simplify :

$(2a+3b+4c)\left(4a^2+9b^2+16c^2-6ab-12bc-8ca\right)$

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22. Simplify :

$(x-2y+3z)\left(x^2+4y^2+9z^2+2xy+6yz-3xz\right)$

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23. By using identity evaluate the following :

$7^3 - 10^3 + 3^3$

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24. By using identity evaluate the following :

$1 + \frac{1}{8} - \frac{27}{8}$

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25. If $2x - 3y - 4z = 0$, then find

$8x^3 - 27y^3 - 64z^3$

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26. Expand the following using identities :

$(7x + 2y)^2$

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27. Expand the following using identities :

$(4m - 3m)^2$

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28. Expand the following using identities :

$(4a + 3b)(4a - 3b)$

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29. Expand the following using identities :

$(k + 2)(k - 3)$

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30. Expand : $(a + b - c)^2$

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31. Expand : $(x + 2y + 3z)^2$

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32. Find the area of the square whose side length is

$m + n - q$

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33. Factories the following

$25m^{-2} - 16n^2$

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34. Factories the following

$x^4 - 9x^2$

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35. Factories the following

$64m^3 + 27n^3$

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36. Factories the following

$729x^3 - 343y^3$

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37. Factories $81x^2 + 90x + 25$

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38. Find $a^3 + b^3$ if $a + b = 6, ab = 5$

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39. Factories $(a-b)^2+7(a-b)+10$

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40. Factories $6x^2+17x+12$

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Exercise 3 5

1. Factories the following expressions :

$2a^2+4a^2b+8a^2c$

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2. Factories the following expressions :

$ab - ac - mb + mc$

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3. Factories the following :

$x^2 + 4x + 4$

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4. Factories the following :

$3a^2 - 24ab + 48b^2$

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5. Factories the following :

$x^5 - 16x$

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6. Factories the following :

$m^2 + \frac{1}{m^2} - 23$

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7. Factories the following :

$6 - 216x^2$

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8. Factories the following :

$a^2 + \frac{1}{a^2} - 18$

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9. Factories the following :

$4x^2 + 9y^2 + 25z^2 + 12xy + 30yz + 20xz$

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10. Factories the following :

$25x^2 + 4y^2 + 9z^2 - 20xy + 12yz + 30xz$

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11. Factories the following :

$8x^2 + 125y^3$

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12. Factories the following :

$27x^3 - 8y^3$

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13. Factories the following :

$a^6 - 64$

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14. Factories the following :

$x^3 + 8y^3 + 6xy - 1$

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15. Factories the following :

$l^3 - 8m^3 - 27m^3 - 18lmn$

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Exercise 3 6

1. Factories the following :

$x^2 + 10x + 24$

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2. Factories the following :

$z^2 + 4z - 12$

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3. Factories the following :

$p^2 - 6p - 16$

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4. Factories the following :

$t^2 + 72 - 17t$

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5. Factories the following :

$y^2 - 16y - 80$

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6. Factories the following :

$a^2 + 10a - 600$

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7. Factories the following :

$2a^2 + 9a + 10$

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8. Factories the following :

$5x^2 - 29xy - 42y^2$

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9. Factories the following :

$9 - 18x + 18x^2$

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10. Factories the following :

$6x^2 + 16xy + 8y^2$

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11. Factories the following :

$12x^2 + 36x^2y + 27y^2x^2$

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12. Factories the following :

$(a+b)^2 + 9(a+b) + 18$

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13. Factories the following :

$(p-q)^2 - 6(p-q) - 16$

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14. Factories the following :

$m^2 + 2mn - 24n^2$

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15. Factories the following :

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

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16. Factories the following :

$a^4 - 3a^2 + 2$

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17. Factories the following :

$8m^3 - 2m^2n - 15mn^2$

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18. Factories the following :

$\frac{1}{x^2} + \frac{1}{y^2} + \frac{2}{xy}$

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19. Factories $x^2 + 4x - 96$

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20. Factories $x^2 + 7xy - 12y^2$

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21. Find the quotient and remainder when $5x^3 - 9x^2 + 10x + 2$ is divided by $x + 2$ using synthetic division.

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22. Find the quotient and remainder when $-7+3x-2x^2+5x^3$ s divided by $-1+4x$ using synthetic division.

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23. If the quotient on dividing $5x^4+4x^3+2x+1$ by $x+3$ is $5x^3+ax^2+bx-97$ then find the values of a,b and also remainder.

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Exercise 3 7

1. Find the quotient and remainder of the following

:

$$\left(4x^3 + 6x^2 - 23x + 18\right) \div (x + 3)$$

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2. Find the quotient and remainder of the following

:

$$\left(8y^3 - 16y^2 + 16y - 15\right) \div (2y - 1)$$

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3. Find the quotient and remainder of the following

:

$$\left(8x^3 - 1\right) \div (2x - 1)$$

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4. Find the quotient and remainder of the following

:

$$\left(-18z + 14z^2 + 24z^3 + 18\right) \div (37 + 4)$$

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5. The area of a rectangle is $x^2 + 7x + 12$. If its breath is $(x + 3)$, then find its length .

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6. The base of a parallelogram is $(5x + 4)$. Find its height, if the area is $25x^2 - 16$.

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7. The sum of $(x + 5)$ observations is $\left(x^3 + 125\right)$. Find the mean of the observations.

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8. Find the quotient and remainder for the following using synthetic division :

$\left(x^3+x^2-7x-3\right) \div (x-3)$

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9. Find the quotient and remainder for the following using synthetic division :

$\left(x^3+2x^2-x-4\right) \div (x+2)$

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10. Find the quotient and remainder for the following using synthetic division :

$$\left(3x^3 - 2x^2 + 7x - 3\right) \div (x + 3)$$

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11. Find the quotient and remainder for the following using synthetic division :

$$\left(8x^3 - 14x^2 - 19x - 8\right) \div (4x + 3)$$

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12. If the quotient obtained on dividing $\left(8x^4 - 2x^2 + 6x - 7\right)$ by $(2x + 1)$ is $\left(4x^3 + px^2 - qx + 3\right)$, then find p,q and also the remainder.

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13. If the quotient obtained on dividing $3x^3 + 11x^2 + 34x + 106$ by $x - 3$ is $3x^2 + ax + b$, then find a,b and also the remainder.

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14. Find the quotient and the remainder when $10 - 4x + 3x^2$ is divided by x - 2.

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15. If $8x^3 - 14x^2 - 19x - 8$ is divided by $4x + 3$ then find the quotient and the remainder.

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Exercise 3 8

1. Factories each of the following polynomials using synthetic division :

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

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2. Factories each of the following polynomials using synthetic division :

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

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3. Factories each of the following polynomials using synthetic division :

$-7x + 3 + 4x^3$

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4. Factories each of the following polynomials using synthetic division :

$x^3 + x^2 - 14x - 24$

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5. Factories each of the following polynomials using synthetic division :

$x^3 - 7x + 6$

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6. Factories each of the following polynomials using synthetic division :

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

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7. Factories $2x^3 - x^2 - 12x - 9$ into linear factors.

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8. Factorize $x^3 + 3x^2 - 13x - 15$

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9. Factorize $x^3 + 13x^2 + 32x + 20$ into linear factors

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Exercise 3 9

1. Find the GCD for the following :

p^5, p^{11}, p^9

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2. Find the GCD for the following :

$4x^3, y^3, z^3$

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3. Find the GCD for the following :

$9a^2b^2c^3, 15a^3b^2c^4$

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4. Find the GCD for the following :

$64x^8, 240x^6$

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5. Find the GCD for the following :

$ab^2c^3, a^2b^3c, a^3bc^2$

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6. Find the GCD for the following :

$35x^5y^3z^4, 49x^2yz^3, 14xy^2z^2$

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7. Find the GCD for the following :

$25ab^2c, 100a^2bc, 125ab$

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8. Find the GCD for the following :

$3abc, 5xyz, 7pqr$

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9. Find the GCD of the following :

$(2x + 5), (5x + 2)$

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10. Find the GCD of the following :

$a^{m+1}, a^{m+2}, a^{m+3}$

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11. Find the GCD of the following :

$2a^2 + a, 4a^2 - 1$

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12. Find the GCD of the following :

$3a^2, 5b^3, 7c^4$

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13. Find the GCD of the following :

$x^4 - 1, x^2 - 1$

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14. Find the GCD of the following :

$a^3 - 9ax^2, (a - 3x)^2$

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15. Find GCD of $25x^2y^2z, 45x^2y^4z^3b$

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16. Find the GCD of $\left(y^3-1\right)$ and $(y-1)$

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17. Find the GCD of $3x^2-48$ and $x^2-7x+12$

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18. Find the GCD of a^x, a^{x+y}, a^{x+y+z}

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Exercise 3 10

1. Draw the graph for the following

$y = 2x$

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2. Draw the graph for the following

$y = 4x - 1$

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3. Draw the graph for the following

$$y = \left(\frac{3}{2}\right)x + 3$$

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4. Draw the graph for the following

$$3x + 2y = 14$$

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5. Solve graphically

$$x + y = 7, x - y = 3$$

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6. Solve graphically

$3x + 2y = 4, 9x + 6y - 12 = 0$

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7. Solve graphically

$\frac{x}{2} + \frac{y}{4} = 1, \frac{x}{2} + \frac{y}{4} = 2$

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8. Solve graphically

$x - y = 0, y + 3 = 0$

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9. Solve graphically

$y = 2x + 1, y + 3x - 6 = 0$

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10. Solve graphically

$x = -3, y = 3$

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11. Two cars are 100 miles apart. If they drive towards each other they will meet in 1 hour. If they drive in the same direction they will meet in 2 hours. Find their speed by using graphical method.

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12. Solve graphically $x - y = 3, 2x - y = 11$

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Exercise 3 11

1. Solve, using the method of substitution

$2x - 3y = 7, 5x + y = 9$

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2. Solve, using the method of substitution

$1.5x + 0.1y = 6.2, 3x - 0.4y = 11.2$

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3. Solve, using the method of substitution

10% of $x + 20\ \%$ of y= 24, $3x - y = 20$

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4. Solve, using the method of substitution

$\sqrt{2}x - \sqrt{3}y = 1, \sqrt{3}x - \sqrt{8}y = 0$

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5. Raman's age is three times the sum of the ages of his two sons. After 5 years his age will be twice the

sum of the ages of his two sons. Find the age of Raman.

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6. The middle digit of a number between 100 and 1000 is zero and the sum of the other digit is 13. If the digits are reversed , the number so formed exceed the original number by 495. Find the number.

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7. Solve using the method of substitution.

$5x - y = 5, 3x + y = 11$

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Exercise 3 12

1. Solve by the method of elimination

$2x - y = 3, 3x + y = 7$

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2. Solve by the method of elimination

$x - y = 5, 3x + 2y = 25$

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3. Solve by the method of elimination

$\frac{x}{10} + \frac{y}{5} = 14, \frac{x}{8} + \frac{y}{6} = 15$

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4. Solve by the method of elimination

$3(2x + y) = 7xy, 3(x + 3y) = 11xy$

Watch Video Solution

5. Solve by the method of elimination

$$\frac{4}{x} + 5y = 7, \frac{3}{x} + 4y = 5$$

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6. Solve by the method of elimination

$$13x + 11y = 70, 11x + 13y = 74$$

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7. The monthly income of A and B are in the ratio $3:4$ and their monthly expenditures are in the ratio $5:7$. If each saves Rs. 5,000 per month, find the monthly income of each .

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8. Five years ago, a man was seven times as old as his son, while five years hence, the man will be four times as old his son. Find thie present age.

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9. Solve by the method of elimination.

$2x + y = 10, 5x - y = 11$

Watch Video Solution

Exercise 3 13

1. Solve by cross-multiplication method

$8x - 3y = 12, 5x - 2y = 7$

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2. Solve by cross-multiplication method

$6x + 7y - 11 = 0, 5x + 2y = 13$

Watch Video Solution

3. Solve by cross-multiplication method

$\frac{2}{x} + \frac{3}{y} = 5, \frac{3}{x} - \frac{1}{y} + 9 = 0$

Watch Video Solution

4. Akshaya has 2 rupee coins and 5 rupee coins in her purse. If in all she has 80 coins totalling Rs. 220,

how many coins of each kind does she have.

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5. It takes 24 hours to fill a swimming pool using two pipes. If the pipe of larger diameter is used for 8 hours and the pipe of the smaller diameter is used for 18 hours. Only half of the pool is filled. How long would each pipe take to fill the swimming pool.

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6. Solve $5x - 2y = 10, 3x + y = 17$ by the method of cross multiplication.

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Exercise 3 14

1. The sum of a two digit number and the number formed by interchanging the digits is 110. If 10 is subtracted from the first number, the new number is 4 more than 5 times the sums of the digits of the first number. Find the first number.

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2. The sum of the numerator and denominator of a fraction is 12. If the denominator is increased by 3, the fraction becomes $\frac{1}{2}$. Find the fraction.

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3. ABCD is a cyclic quadrilateral such that $\angle A = (4y + 20)^\circ, \angle B = (3y - 5)^\circ, \angle C = (4x)^\circ$ and $\angle D = (7x + 5)^\circ$. Find the four angles.

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4. On selling a T.V. at 5% gain and a fridge at 10% gain, a shopkeeper gains Rs. 2000. But if he sells the T.V. at 10% gains and the fridge at 5% loss, he gains Rs. 1500 on the transaction. Find the actual price of the T.V. and the fridge.

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5. Two numbers are in the ratio $5:6$. If 8 is subtracted from each of the numbers the ratio becomes $4:5$. Find the numbers.

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6. 4 Indians and 4 Chinese can do a piece of work in 3 days. While 2 Indians and 5 Chinese can finish it in 4 days. How long would it take for 1 Indian to do it ? How long would it takes for 1 Chinese to do it ?

Watch Video Solution

7. The age of Arjun is twice the sum of the ages of his two children. After 20 years, his age will be equal to the sum of the ages of his children. Find the age of the father.

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Exercise 3 15 Multiple Choice Questions

1. If $x^3 + 6x^2 + kx + 6$ is exactly divisible by $(x + 2)$, then $k = ?$

A. -6

B. -7

C. -8

D. 11

Answer: 11

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2. The root of the polynomial equation $2x + 3 = 0$ is

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

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

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

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

Answer: $-\frac{3}{2}$

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3. The type of the polynomial $4 - 3x^3$ is

A. constant polynomial

B. linear polynomial

C. quadratic polynomial

D. cubic polynomial

Answer: cubic polynomial

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4. If $x^{51} + 51$ is divided by $x + 1$, then the remainder is

A. 0

B. 1

C. 49

D. 50

Answer: 50

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5. The zero of the polynomial $2x + 5$ is

A. $\frac{5}{2}$

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

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

D. $-\frac{2}{5}$

Answer: $-\frac{5}{2}$

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6. The sum of the polynomials $p(x) = x^3 - x^2 - 2, q(x) = x^2 - 3x + 1$

A. $x^3 - 3x - 1$

B. $x^3 + 2x^2 - 1$

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

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

Answer: $x^3 - 3x - 1$

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7. Degree of the polynomial $\left(y^3 - 2\right)\left(y^3 + 1\right)$ is

A. 9

B. 2

C. 3

D. 6

Answer: 6

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8. Let the polynomials be

(1) $-13q^5 + 4q^2 + 12q$ (2) $\left(x^2 + 4\right)\left(x^2 + 9\right)$

(3) $4q^8 - q^6 + q^2$ (4) $-\frac{5}{7}y^{12} + y^3 + y^5$

Then ascending order of their degree is

A. A,B,D,C

B. A,B,C,D

C. B,C,D,A

D. B,A,C,D

Answer: B,A,C,D

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9. If p(a) = 0 then (x-a) is a _____ of p(x)

A. divisor

B. quotient

C. remainder

D. factor

Answer: A::C

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10. Zeros of (2-3x) is _____

A. 3

B. 2

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

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

Answer: $\frac{2}{3}$

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11. Which of the following has x-1 as a factor ?

A. 2x -1

B. 3x -3

C. 4x - 3

D. 3x - 4

Answer: 3x - 3

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12. If x - 3 is a factor of p(x) , then the remainder is

A. 3

B. -3

C. p(3)

D. p(-3)

Answer: p(3)

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13. $(x+y)\left(x^2-xy+y^2\right)$ is equal to

A. $(x+y)^3$

B. $(x-y)^3$

C. x^3+y^3

D. x^3-y^3

Answer: $x^3 + y^3$

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14. $(a + b - c)^2$ is equal to _____

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

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

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

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

Answer: $(- a - b + c)^2$

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15. In an expression $ax^2 + bx + c$ the sum and product of the factors respectively,

A. a,bc

B. b,ac

C. ac,b

D. bc,a

Answer: b,ac

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16. If $(x+5)$ and $(x-3)$ are the factors of ax^2+bx+c, then values of a,b and c are

A. 1,2,3

B. 1,2,15

C. 1,2,-15

D. 1,-2,15

Answer: 1,2,-15

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17. Cubic polynomial may have maximum of _____ linear factors.

A. 1

B. 2

C. 3

D. 4

Answer: 3

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18. Degree of the constant polynomial is _____

A. 3

B. 2

C. 1

D. 0

Answer:

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19. Find the value of m from the equation $2x + 3y = m$. If its one solution is x = 2 and y = -2

A. 2

B. -2

C. 10

D. 0

Answer: -2

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20. Which of the following is a linear equations ?

A. $x + \frac{1}{x} = 2$

B. $x(x - 1) = 2$

C. $3x + 5 = \frac{2}{3}$

D. $x^3 - x = 5$

Answer: $3x + 5 = \frac{2}{3}$

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21. Which of the following is a solution of the equation $2x - y = 6$?

A. (2,4)

B. (4,2)

C. (3,-1)

D. (0,6)

Answer: (4,2)

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22. If (2,3) is a solution of linear equation $2x + 3y = k$ then, the value of k is

A. 12

B. 6

C. 0

D. 13

Answer: 13

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23. Which condition does not satisfy the linear equation $ax + by + c = 0$

A. $a \neq 0, b = 0$

B. $a = 0, b \neq 0$

C. $a = 0, b = 0, c \neq 0$

D. $a \neq 0, b \neq 0$

Answer:

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24. Which of the following is not a linear equation is two variable

A. $ax + by + c = 0$

B. $0x + 0y + c = 0$

C. $0x + by + c = 0$

D. $ax + 0y + c = 0$

Answer: $0x + 0y + c = 0$

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25. The value of k for which the pair of linear equations $4x + 6y - 1 = 0$ and $2x + ky - 7 = 0$ represents parallel lines is

A. k= 3

B. k=2

C. k = 4

D. k = - 3

Answer: k = 3

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26. A pair of linear equations has no solution then the graphical representation is

A. 

B. 

C. 

D. 

Answer: 2

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27. If $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ where $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ then the given pair of linear equation has _____ solution (s)

A. no solution

B. two solutions

C. unique

D. infinite

Answer: unique

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28. If $\frac{a_1}{a_2} = \frac{b_1}{b_2} \not= \frac{c_1}{c_2}$ where $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ then the given pair of linear equation has _____ solution (s) .

A. no solution

B. two solutions

C. infinite

D. unique

Answer: no solution

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29. GCD of any two prime numbers is _____

A. -1

B. 0

C. 1

D. 2

Answer: 1

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30. The GCD of $x^4 - y^4$ and $x^2 - y^2$ is

A. $x^4 - y^4$

B. $x^2 - y^2$

C. $(x + y)^2$

D. $(x + y)^4$

Answer: $x^2 - y^2$

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31. The polynomial 3x - 2 is a

A. linear polynomial

B. quadratic polynomial

C. cubic polynomial

D. constant polynomial

Answer: linear polynomials

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32. The polynomial $4x^2 + 2x - 2$ is a

A. linear polynomial

B. quadratic polynomial

C. cubic polynomial

D. constant polynomial

Answer: quadratic polynomial

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33. The zero of the polynomial $2x - 5$ is

A. $\frac{5}{2}$

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

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

D. $-\frac{2}{5}$

Answer: $\frac{5}{2}$

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34. The root of the polynomial equation $3x - 1 = 0$ is

A. $x = -\frac{1}{3}$

B. $x = \frac{1}{3}$

C. $x = 1$

D. $x = 3$

Answer: $x = \frac{1}{3}$

Watch Video Solution

35. Zero of $(7 + 4x)$ is _____

A. $\frac{4}{7}$

B. $\frac{-7}{4}$

C. 7

D. 4

Answer: $\frac{-7}{4}$

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36. Which of the following has a factor ?

A. $x^2 + 2x$

B. $(x - 1)^2$

C. $(x + 1)^2$

D. $(x^2 - 2^2)$

Answer: $x^2 + 2x$

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37. If x -2 is a factor of q(x) , then the remainder is

_____

A. $q(-2)$

B. $x - 2$

C. 0

D. -2

Answer: 0

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38. $(a - b)\left(a^2 + ab + b^2\right) =$ _____

A. $a^3 + b^3 + c^3 - 3abc$

B. $a^2 - b^2$

C. $a^3 + b^3$

D. $a^3 - b^3$

Answer: $a^3 - b^3$

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39. The polynomial whose factors are $(x + 2)(x + 3)$ is _____

A. $x^2 + 5x + 6$

B. $x^2 - 4$

C. $x^2 - 9$

D. $x^2 + 6x + 5$

Answer: $x^2 + 5x + 6$

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40. $(-a-b-c)^2$ is equal to _____

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

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

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

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

Answer: $(a+b+c)^2$

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Exercise 3 1 Additional Questions And Answers

1. Classify the following polynomials based on number of terms

$x^3 - x^2$

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2. Classify the following polynomials based on number of terms

$5x$

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3. Classify the following polynomials based on number of terms

$4x^4 + 2x^3 + 1$

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4. Classify the following polynomials based on number of terms

$4x^3$

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5. Classify the following polynomials based on number of terms

$x + 2$

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6. Classify the following polynomials based on number of terms

$3x^2$

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7. Classify the following polynomials based on number of terms

$y^4 + 1$

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8. Classify the following polynomials based on number of terms

$y^{20} + y^{18} + y^2$

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9. Classify the following polynomials based on number of terms

6

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10. Classify the following polynomials based on number of terms

$2u^3 + u^2 + 3$

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11. Classify the following polynomials based on number of terms

$u^{23} - u^4$

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12. Classify the following polynomials based on number of terms

y

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13. Classify the following polynomials based on their degree.

$p(x) = 3$

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14. Classify the following polynomials based on their degree.

$p(y) = \frac{5}{2}y^2 + 1$

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15. Classify the following polynomials based on their degree.

$p(x) = 2x^3 - x^2 + 4x + 1$

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16. Classify the following polynomials based on their degree.

$p(x) = 3x^2$

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17. Classify the following polynomials based on their degree.

$p(x) = x + 3$

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18. Classify the following polynomials based on their degree.

$p(x) = -7$

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19. Classify the following polynomials based on their degree.

$p(x) = x^3 + 1$

Watch Video Solution

20. Classify the following polynomials based on their degree.

$p(x) = 5x^2 - 3x + 2$

Watch Video Solution

21. Classify the following polynomials based on their degree.

$p(x) = 4x$

Watch Video Solution

22. Classify the following polynomials based on their degree.

$p(x) = \frac{3}{2}$

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23. Classify the following polynomials based on their degree.

$p(x) = \sqrt{3}x + 1$

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24. Classify the following polynomials based on their degree.

$p(y) = y^3 + 3y$

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25. Find the product of given polynomials $p(x) = 3x^3 + 2x - x^2 + 8$ and $q(x) = 7x + 2$

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26. Let $P(x) = 4x^2 - 3x + 2x^3 + 5$ and $q(x) = x^2 + 2x + 4$ find $p(x) - q(x)$.

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Text Book Activities

1. Write the following polynomials in standard form.

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2. Find the value of k for the given system of linear equations satisfying th condition below :

$2x + ky = 1, 3x - 5y = 7$ has a unique solution

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3. Find the value of k for the given system of linear equations satisfying th condition below :

$kx + 3y = 3, 12x + ky = 6$ has no solution

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4. Find the value of k for the given system of linear equations satisfying th condition below :

$(k - 3)x + 3y = k, kx + ky = 12$ has infinite number of solution

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5. Find the value of a and b for which the given system of linear equation has infinite number of solutions

$3x - (a+1)y = 2b - 1, 5x + (1-2a)y = 3b$

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Unit Test

1. Let the polynomials be

(1) $-13q^5 + 4q^2 + 12q$ (2) $\left(x^2+4\right)\left(x^2+9\right)$

(3) $4q^8 - q^6 + q^2$ (4) $-\frac{5}{7}y^{12} + y^3 + y^5$

Then ascending order of their degree is

A. A,B,D,C

B. A,B,C,D

C. B,C,D,A

D. B,A,C,D

Answer: A::B::C::D

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2. If $x^{51} + 51$ is divided by $x + 1$, then the remainder is

A. 0

B. 1

C. 49

D. 50

Answer:

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3. The sum of the polynomials $p(x) = x^3 - x^2 - 2, q(x) = x^2 - 3x + 1$

A. $x^3 - 3x - 1$

B. $x^3 + 2x^2 - 1$

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

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

Answer: $x^3 - 3x - 1$

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4. Degree of the constant polynomial is _____

A. 3

B. 2

C. 1

D. 0

Answer: 0

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5. The value of k for which the pair of linear equations $4x + 6y - 1 = 0$ and $2x + ky - 7 = 0$ represents parallel lines is

A. $k = 3$

B. $k = 2$

C. k=4

D. k= - 3

Answer: k = 3

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Section B

1. The cost of a chocolate is Rs. $(x + y)$ and Amir bought $(x + y)$ chocolates. Find the total amount paid by him in terms of x and y. If x = 10, y = 5 find the amount paid by him.

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2. Find the value of the polynomial $f(y) = 6y - 3y^2 + 3$ at (i) y = 1 (ii) y = -1 (iii) y = 0

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3. Find the quotient and remainder of the following :

$(8x^3 - 1) \div (2x - 1)$

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4. What is the remainder when $x^{2018} + 2018$ is divided by x-1 .

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5. Check whether p(x) is a multiple of g(x) or not.

$p(x) = x^3 - 5x^2 + 4x - 3, g(x) = x - 2$

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6. Expand the following :

$(-p + 2q + 3r)^2$

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7. Find the GCD for the following :

p^5, p^{11}, p^9

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Section C

1. The sum of $(x+5)$ observations is $\left(x^3+125\right)$.

Find the mean of the observations.

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2. Verify whether the following are zeros of the polynomial indicated against them, or not.

$p(x) = 2x - 1, x = \frac{1}{2}$

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3. Verify whether the following are zeros of the polynomial indicated against them, or not.

$p(x) = x^3 - 1, x = 1$

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4. Verify whether the following are zeros of the polynomial indicated against them, or not.

$p(x) = ax + b, x = \frac{-b}{a}$

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5. Verify whether the following are zeros of the polynomial indicated against them, or not.

$p(x) = (x + 3)(x - 4), x = 4, x = -3$

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6. Add the following polynomials and find the degree of the resultant polynomial.

(i) $p(x) = 6x^2 - 7x + 2$

$q(x) = 6x^3 - 7x + 15$

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7. Add the following polynomials and find the degree of the resultant polynomial.

(ii) $h(x) = 7x^3 - 6x + 1$

$f(x) = 7x^2 + 17x - 9$

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8. Add the following polynomials and find the degree of the resultant polynomial.

(iii) $f(x) = 16x^4 - 5x^2 + 9$

$g(x) = -6x^3 + 7x - 15$

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9. Determine whether $(x - 1)$ is a factor of the following polynomials :

$x^3 + 5x^2 - 10x + 4$

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10. Determine whether $(x-1)$ is a factor of the following polynomials :

x^4+5x^2-5x+1