MATHS

BOOKS - RS AGGARWAL MATHS (HINGLISH)

POLYNOMIALS

Solved Examples

1. Give reasons to show that none of the following expressions is a polynomial.

(i) $f(x) = x + \frac{1}{x}$

(ii) $g(x) = \sqrt{x} - 3$

(iii) $h(y) = \sqrt[3]{y} - 6$

(iv) $p(x) = \frac{(x-1)(x-3)}{x}$

(v) $q(x) = \dfrac{1}{x+2}$

(vi) $r(x) = \dfrac{x+3}{x+4}$

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2. Which of the following expressions are polynomials ? In case of a polynomial write its degree.

(i) $x^3 - 5x + 2$

(ii) $y^2 + \sqrt{2}y - \sqrt{5}$

(iii) $2\sqrt{x} + 7$

(iv) -6

(v) $4t^2 + \dfrac{1}{6}t + 2\sqrt{3}$

(vi) $z^2 + \dfrac{5}{z^2} + 1$

(vii) $\dfrac{1}{3x}$

(viii) $1 - \sqrt{5x}$

(ix) $\frac{1}{4x^{-2}} + 3x + 5$

(x) $\frac{6\sqrt{x} + x^{3/2}}{\sqrt{x}}$

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3. Classify the following as constant , linear , quadratic , cubic and quartic polynomials .

(i) $x - x^3$

(ii) $y^4 - y$

(iii) $y + y^2 + 4$

(iv) $\sqrt{2}x - 1$

(v) $5x^3$

(vi) 3

(vii) t^2

(viii) $2 + x$

(ix) $5t - \sqrt{7}$

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4. Write the coefficient of x^2 in each of the following.

(i) $(x-1)(3x-4)$

(ii) $(2x-5)\left(2x^2-3x+1\right)$

(iii) $5x-3$

(iv) $\frac{\pi}{2}x^2+x.$

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5. Give an example of a polynomial , which is (i) a monomial of degree 1 (ii) a monomial of degree 5 (iii) a binomial of degree 20 (iv) a trinomial of degree 3

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6. For the polynomial $\frac{x^3+2x+3}{5}-\frac{7}{2}x^2-x^6$,write (i) the degree of the polynomial ,

(ii) the coefficient of x^3,

(iii) the coefficient of x^6 ,

(iv) the constant term.

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7. Determine the degree of each of the following polynomials.

(i) 2x-1 (ii) -10

(iii) $x^3-9x+3x^5$ (iv) $y^3\left(1-y^4\right)$

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8. (i) If $p(x) = 3x^2 - 5x + 6$, find $p(2)$.

(ii) If $q(x) = x^2 - 2\sqrt{2}x + 1$, find $q(2\sqrt{2})$.

(iii) If $r(x) = 5x - 4x^2 + 3$ find $r(-1)$.

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9. If $p(x) = x^3 + 2x^2 - 5x - 6$, find $p(2), p(-1), p(-3)$ and $p(0)$. What do you conclude about the zeros of p(x) ? Is 0 a zero of p(x)?

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10. Check whether -2 and 2 are the zeros of the polynomial x+2 .

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11. Find a zero of the polynomial

(i) $p(x) = x - 3$

(ii) $q(x) = 3x + 2$

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12. Find a zero of the polynomial $p(x) = ax + b, a \neq 0$ and a , b are real numbers.

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13. If $P(x) = x + 3,$ then $p(x) + p(-x)$ is equal to

A. 0

B. -6

C. 6

D. 9

Answer: C

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14. Verify division algorithm for the polynomials

$p(x) = 3x^4 - 4x^3 - 3x - 1$ and $g(x) = x - 2$.

Find $p(2)$. What do you observe ?

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15. Verify division algorithm for the polynomials

$p(x) = x^3 + x^2 + 2x + 3$ and $g(x) = x + 2$.

Find $p(-2)$. What do you observe ?

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16. Find the remainder when the polynomial $p(x) = x^4 + 2x^3 - 3x^2 + x - 1$ is divided by $g(x) = x - 2$.

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17. Find the remainder when the polynomial $p(x) = x^3 - 3x^2 + 4x + 50$ is divided by $g(x) = x + 3$.

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18. $f(x) = 4x^3 - 12x^2 + 14x - 3,\ g(x) = 2x - 1$

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19. Find the remainder when the polynomial $p(x) = 12x^3 - 13x^2 - 5x + 7$ is divided by $g(x) = (2 + 3x)$.

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20. Find the remainder when $x^3 + 3x^2 + 3x + 1$ is divided by $(x + \pi)$.

A. $\pi^3 + 3\pi^2 - 3\pi + 1$

B. $-\pi^3 - 3\pi^2 - 3\pi + 1$

C. $-\pi^3 + 3\pi^2 - 3\pi + 1$

D. $-\pi^3 + 3\pi^2 - 3\pi - 1$

Answer: C

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21. Let $p(x) = x^3 - x + 1$ and $g(x) = 2 - 3x$, Check whether $p(x)$ is a multiple of g (x) or not .

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22. Check whether $7 + 3x$is a factor of $3x^3 + 7x$.

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23. If the polynomials $\left(2x^3 + ax^2 + 3x - 5\right)$ and $\left(x^3 + x^2 - 2x + a\right)$ leave the same remainder when divided by $(x - 2)$, find the value of a .Also , find the remainder in each case.

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24. If $p(x) = 8x^3 - 6x^2 - 4x + 3$ and $g(x) = \frac{x}{3} - \frac{1}{4}$ then check whether g (x) is a factor of p(x) or not.

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25. Show that $(2x - 3)$ is a factor of $\left(x + 2x^3 - 9x^2 + 12\right)$.

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26. Use factor theorem to show that $x^4 + 2x^3 - 2x^2 + 2x - 3$ is exactly divisible by $(x + 3)$.

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27. If $(x-a)$ is a factor of $\left(x^3-ax^2+2x+a-1\right)$, find the value of a.

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28. For what value of m is $\left(x^3-2mx^2+16\right)$ divisible by $(x+2)$?

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29. Without actual division , prove that $\left(2x^4+3x^3-12x^2-7x+6\right)$ is exactly divisible by $\left(x^2+x-6\right)$.

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30. Find the values of a and b so that $\left(2x^3 + ax^2 + x + b\right)$ has $(x + 2)$ and $(2x - 1)$ as factors.

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31. If $\left(ax^3 + bx^2 - 5x + 2\right)$ has $(x + 2)$ as a factor and leaves a remainder 12 when divided by $(x - 2)$, find the values of a and b.

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32. What must be added to $\left(x^3 - 3x^2 + 4x - 15\right)$ to obtain a polynomial which is exactly divisible by $(x - 3)$?

A. 2

B. 3

C. -3

D. -2

Answer: B

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33. What must be subtracted from $\left(4x^4 - 2x^3 - 6x^2 + 2x + 6\right)$ so that the result is exactly divisible by $\left(2x^2 + x - 1\right)$?

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Exercise 2 A

1. Which of the following expressions are polynomials ? In case of a polynomial , write its degree.

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

(ii) $y^3 + \sqrt{3}y$

(iii) $t^2 - \frac{2}{5}t + \sqrt{5}$

(iv) $x^{100} - 1$

(v) $\frac{1}{\sqrt{2}}x^2 - \sqrt{2}x + 2$

(vi) $x^{-2} + 2x^{-1} + 3$

(vii) 1

(viii) $\frac{-3}{5}$

(ix) $\frac{x^2}{2} - \frac{2}{x^2}$

(x) $\sqrt[3]{2}x^2 - 8$

(xi) $\frac{1}{2x^2}$

(xii) $\frac{1}{\sqrt{5}}x^{1/2} + 1$

(xiii) $\frac{3}{5}x^2 - \frac{7}{3}x + 9$

(xiv) $x^4 - x^{3/2} + x - 3$

(xv) $2x^3 + 3x^2 + \sqrt{x} - 1$

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2. Identify constant , linear quadratic , cubic and biquadratic polynomials from the following. (i) $-7+x$ (ii) 6y (iii) $-z^3$ (iv) $1-y-y^3$ (v) $x-x^3+x^4$ (vi) $1+x+x^2$ (vii) $-6x^2$ (viii) -13 (ix) $-p$

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3. Write

(i) the coefficient of x^3 in $3x^2-5x^3+x^4$.

(ii) the coefficient of x in $\sqrt{3}-2\sqrt{2}x+6x^2$.

(iii) the coefficient of x^2 in $2x-3+x^3$,

(iv) the coefficient of x in $\frac{3}{8}x^2-\frac{2}{7}x+\frac{1}{6}$.

(v) the constant term in $\frac{\pi}{2}x^2+7x-\frac{2}{5}\pi$.

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4. Determine the degree of each of the following polynomials.

(i) $\dfrac{4x - 5x^2 + 6x^3}{2x}$

(ii) $y^2(y - y^3)$

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

(iv) $-\dfrac{1}{2}x + 3$

(v) -8

(vi) $x^{-2}(x^4 + x^2)$

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5. (i) Give an example of a monomial of degree 5.

(ii) Give an example of a binomial of degree 8.

(iii) Given an example of a trinomial of degree 4.

(iv) Give an example of a monomial of degree 0.

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6. Rewrite each of the following polynomials in standard form.

(i) $x - 2x^2 + 8 + 5x^3$

(ii) $\frac{2}{3} + 4y^2 - 3y + 2y^3$

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

(iv) $2 + t - 3t^3 + t^4 - t^2$

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Exercise 2 B

1. If $p(x) = 5 - 4x + 2x^2$, find $(i)p(0)\ (ii)p(3)\ (iii)p(-2)$

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2. If $p(y) = 4 + 3y - y^2 + 5y^3$, find

(i) p (0) ,

(ii) p(2) ,

(iii) $p(-1)$.

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3. If $f(t) = 4t^2 - 3t + 6$, find

(i) f (0) ,

(ii) f (4) ,

(iii) $f(-5)$.

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4. If $p(x) = x^3 - 3x^2 + 2x$, find p (0) , p(1) , p(2). What do you conclude?

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5. If $p(x) = x^3 + x^2 - 9x - 9$, find p (0) , p (3) , p (-3) and p(-1). What do you conclude about the zeros of p (x) ? Is 0 a zero of p (x)?

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6. Verify that (i) 4 is a zero of the polynomial , p (x) = x -4. (ii) -3 is a zero of the polynomial , q (x) = x+3. (iii) $\frac{2}{5}$ is a zero of the polynomial , f (x) =2 - 5x. (iv) $\frac{-1}{2}$ is a zero of the polynomial , g (y) = 2y +1.

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7. Verify that

(i) 1 and 2 are the zeros of the polynomial , $p(x) = x^2 - 3x + 2$.

(ii) 2 and -3 are the zeros of the polynomial , $q(x) = x^2 + x - 6$.

(iii) 0 and 3 are the zero of the polynomial , $r(x) = x^2 - 3x$.

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8. Find the zero of the polynomial :

$p(x) = x - 5$

(ii) $q(x) = x + 4$

(iii) $r(x) = 2x + 5$

(iv) $f(x) = 3x + 1$

(v) $g(x) = 5 - 4x$

(vi) $h(x) = 6x - 2$

(vii) $p(x) = ax, a \neq 0$

(viii) $q(x) = 4x$

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9. If 2 and 0 are the zeros of the polynmial $f(x) = 2x^3 - 5x^2 + ax + b$ then find the values of a and b.

A. a = -2 , b = 0

B. a = 2 , b = 1

C. a = 2 , b = 0

D. a=2 , b= -1

Answer: C

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Exercise 2 C

1. By actual division, find the quotient and the remainder when the first polynomial is divided by the second polynomial $x^4 + 1$ and $x - 1$.

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2. Verify the division algorithm for the polynomials $p(x) = 2x^4 - 6x^3 + 2x^2 - x + 2$ and $g(x) = x + 2$.

$p(x) = 2x^3 - 7x^2 + 9x - 13, g(x) = x - 3.$

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

$p(x) = x^3 - 6x^2 + 9x + 3, g(x) = x - 1.$

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

$p(x) = 2x^3 - 7x^2 + 9x - 13, g(x) = x - 3.$

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

$p(x) = 3x^4 - 6x^2 + 8x - 2, g(x) = x - 2.$

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6. Using the remainder theorem , find the remainder , when $p(x)$ is divided by $g(x)$, where

$p(x) = 2x^3 - 9x^2 + x + 15,\ g(x) = 2x - 3.$

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

$p(x) = x^3 - 2x^2 - 8x - 1, g(x) = x + 1.$

A. 3

B. 4

C. 2

D. 1

Answer: B

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

$p(x) = 2x^3 + x^2 - 15x - 12, g(x) = x + 2.$

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

$p(x) = 6x^3 + 13x^2 + 3, g(x) = 3x + 2.$

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

$p(x) = x^3 - 6x^2 + 2x - 4, g(x) = 1 - \frac{3}{2}x.$

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

$p(x) = 2x^3 + 3x^2 - 11x - 3, g(x) = \left(x + \frac{1}{2}\right).$

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

$p(x) = x^3 - ax^2 + 6x - a, g(x) = x - a.$

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13. The polynomials $\left(2x^3 + x^2 - ax + 2\right)$ and $\left(2x^3 - 3x^2 - 3x + a\right)$ when divided

by $(x-2)$ leave the same remainder . Find the value of a.

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14. The polynomials $f(x) = x^4 - 2x^3 + 3x^2 - ax + b$ when divided by $(x-1)$and $(x+1)$ leaves the remainders 5 and 19 respectively. Find the values of a and b.. Hence, find the remainder when $f(x)$ is divided by (x-2)`.

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15. If $p(x) = x^3 - 5x^2 + 4x - 3$ and $g(x) = x - 2$ show that p(x) is not a multiple of g(x).

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16. If $p(x) = 2x^3 - 11x^2 - 4x + 5$ and $g(x) = 2x + 1$, show that g(x) is not a factor of p(x).

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Exercise 2 D

1. Using factor theorem , show that g (x) is a factor of p(x) , when $p(x) = x^3 - 8, g(x) = x - 2$

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2. Using factor theorem , show that g (x) is a factor of p(x) , when $p(x) = 2x^3 + 7x^2 - 24x - 45, g(x) = x - 3$

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3. Using factor theorem , show that g (x) is a factor of p(x) , when

$p(x) = 2x^4 + 9x^3 + 6x^2 - 11x - 6, g(x) = x - 1$

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4. Using factor theorem , show that g (x) is a factor of p(x) , when

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

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5. Using factor theorem , show that g (x) is a factor of p(x) , when

$p(x) = 69 + 11x - x^2 + x^3, g(x) = x + 3$

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6. Using factor theorem , show that g (x) is a factor of p(x) , when

$p(x) = 2x^3 + 9x^2 - 11x - 30, g(x) = x + 5$

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7. Using factor theorem , show that g (x) is a factor of p(x) , when

$p(x) = 2x^4 + x^3 - 8x^2 - x + 6, g(x) = 2x - 3$

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8. Using factor theorem , show that g (x) is a factor of p(x) , when

$p(x) = 3x^3 + x^2 - 20x + 12, g(x) = 3x - 2$

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9. Using factor theorem , show that g (x) is a factor of p(x) , when

$p(x) = 7x^2 - 4\sqrt{2}x - 6, g(x) = x - \sqrt{2}$

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10. Using factor theorem , show that g (x) is a factor of p(x) , when

$p(x) = 2\sqrt{2}x^2 + 5x + \sqrt{2}, g(x) = x + \sqrt{2}$

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11. Show that $(p - 1)$ is a factor of $\left(p^{10} - 1\right)$ and also of $\left(p^{11-1}\right)$

.

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12. Find the value of k for which (x-1) is a factor of $\left(2x^3+9x^2+x+k\right)$.

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13. Find the value of a for which (x-4) is a factor of $\left(2x^3-3x^2-18x+a\right)$.

A. a =- 6

B. a =- 7

C. a =- 8

D. a =- 9

Answer: C

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14. Find the value of a for which (x +1) is a factor of $(ax^3 + x^2 - 2x + 4a - 9)$.

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15. Find the value of a for which (x+2a) is a factor of $(x^5 - 4a^2x^3 + 2x + 2a + 3)$.

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16. Find the value of m for which $(2x - 1)$ is a factor of $(8x^4 + 4x^3 - 16x^2 + 10x + m)$.

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17. Find the value of a which the polynomial $\left(x^4 - x^3 - 11x^2 - x + a\right)$ is divisible by (x+3).

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18. Without actual division, prove that $x^4 + 2x^3 - 2x^2 + 2x - 3$ is exactly divisible by $x^2 + 2x - 3$.

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19. If $\left(x^3 + ax^2 + bx + 6\right)$ has $(x - 2)$ as a factor and leaves a remainder 3 when divided by $(x - 3)$, find the values of a and b.

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20. Find the values of a and b so that the polynomial $\left(x^3 - 10x^2 + ax + b\right)$ is exactly divisible by (x -1) as well as (x -2).

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21. Find the values of a and b so that the polynomial $\left(x^3 - 10x^2 + ax + b\right)$ is exactly divisible by (x-1) as well as (x-2).

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22. If both (x- 2) and $\left(x - \frac{1}{2}\right)$ are factor of $px^2 + 5x + r$, then the relation between p and r

A. $p = r^2$

B. $p = \frac{1}{r}$

C. -p = r

D. p = r

Answer: D

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23. Without actual division , prove that $2x^4 - 5x^3 + 2x^2 - x + 2$ is divisible by $x^2 - 3x + 2$.

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24. What must be added to $2x^4 - 5x^3 + 2x^2 - x - 3$ so that the result is exactly divisible by (x-2) ?

A. -5

B. 4

C. 5

D. -4

Answer: C

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25. What must be subtracted from $\left(x^4+2x^3-2x^2+4x+6\right)$ so that the result is exactly divisible by $\left(x^2+2x-3\right)$?

A. 2x+9

B. 9x+2

C. $-x^2+5$

D. None of these

Answer: A

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26. Use factor theorem to prove that (x+a) is a factor of $(x^n + a^n)$ for any odd positive integer n .

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Multiple Choice Questions Mcq

1. Which of the following expressions is a polynomial in one variable ?

A. $x + \frac{2}{x} + 3$

B. $3\sqrt{x} + \frac{2}{\sqrt{x}} + 5$

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

D. $x^{10} + y^5 + 8$

Answer: C

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2. Which of the following expressions is a polynomial ?

A. $\sqrt{x} - 1$

B. $\frac{x-1}{x+1}$

C. $x^2 - \frac{2}{x^2} + 5$

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

Answer: D

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3. Which of the following is a polynomial ?

A. $\sqrt[3]{y} + 4$

B. $\sqrt{y} - 3$

C. y

D. $\frac{1}{\sqrt{y}} + 7$

Answer: C

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4. Which of the following is a polynomial ?

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

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

C. $\sqrt{x}+3$

D. -4

Answer: D

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5. Which of the following is a polynomial ?

A. $x^{-2}+x^{-1}+3$

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

C. x^{-1}

D. 0

Answer: D

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6. Which of the following is a quadratic polynomial ?

A. $x + 4$

B. $x^3 + x$

C. $x^3 + 2x + 6$

D. $x^2 + 5x + 4$

Answer: D

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7. Which of the following is a linear polynomial ?

A. $x + x^2$

B. $x + 1$

C. $5x^2 - x + 3$

D. $x + \frac{1}{x}$

Answer: B

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8. Which of the following is a binomial ?

A. $x^2 + x + 3$

B. $x^2 + 4$

C. $2x^2$

D. $x + 3 + \frac{1}{x}$

Answer: B

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9. $\sqrt{3}$ is a polynomial of degree

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

B. 2

C. 1

D. 0

Answer: D

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10. Degree of the zero polynomial is

A. 1

B. 0

C. not defined

D. none of these

Answer: C

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11. Zero of the zero polynomial is

A. 0

B. 1

C. every real number

D. not defined

Answer: C

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12. If $p(x) = x + 4$ then $p(x) + p(-x) = ?$

A. 0

B. 4

C. $2x$

D. 8

Answer: D

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13. If $P(x) = x^2 - 2\sqrt{2}x + 1$ then $p\left(2\sqrt{2}\right)$ is equal to?

A. 0

B. 1

C. $4\sqrt{2}$

D. -1

Answer: B

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14. If $p(x) = 5x - 4x^2 + 3$ then $p(-1) = ?$

A. 2

B. -2

C. 6

D. -6

Answer: D

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15. If $\left(x^{51}+51\right)$ is divided by $(x+1)$ then the remainder is

A. 0

B. 1

C. 49

D. 50

Answer: D

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16. If (x+1) is a factor of the polynomial $\left(2x^2+kx\right)$ then k = ?

A. 4

B. -3

C. 2

D. -2

Answer: C

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17. When $p(x) = x^4 + 2x^3 - 3x^2 + x - 1$ is divided by $(x - 2)$, the remainder is

A. 0

B. -1

C. -15

D. 21

Answer: D

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18. When $p(x) = x^3 - 3x^2 + 4x + 32$ is divided by $(x + 2)$, the remainder is

A. 0

B. 32

C. 36

D. 4

Answer: D

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19. When $p(x) = 4x^3 - 12x^2 + 11x - 5$ is divided by (2x - 1) , the remainder is

A. 0

B. -5

C. -2

D. 2

Answer: C

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20. When $p(x) = x^3 - ax^2 + x$ is divided by $(x - a)$, the remainder is

A. 0

B. a

C. 2a

D. 3a

Answer: B

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21. When $p(x) = x^3 + ax^2 + 2x + a$ is divided by $(x + a)$, the remainder is

A. 0

B. a

C. $-a$

D. 2a

Answer: C

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22. $(x+1)$ is a factor of the polynomial

A. x^3+x^2-x+1

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

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

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

Answer: B

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23. Zero of the polynomial $p(x)=2x+5$ is

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

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

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

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

Answer: B

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24. The zeros of the polynomial $p(x) = x^2 + x - 6$ are

A. $2, 3$

B. $-2, 3$

C. $2, \ -3$

D. $-2, \ -3$

Answer: C

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25. The zeros of the polyomial $p(x) = 2x^2 + 5x - 3$ are

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

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

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

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

Answer: B

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26. The zeros of the polynomial $p(x) = 2x^2 + 7x - 4$ are

A. $4, \frac{-1}{2}$

B. $4, \frac{1}{2}$

C. $-4, \frac{1}{2}$

D. $-4, \frac{-1}{2}$

Answer: C

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27. If $(x+5)$ is a factor of $p(x) = x^3 - 20x + 5k$ then $k = ?$

A. -5

B. 5

C. 3

D. -3

Answer: B

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28. If $(x+2)$ and $(x-1)$ are factors of the polynomial $p(x) = x^3 + 10x^2 + mx + n$ then

A. m = 5 , n = - 3

B. m = 7 , n = - 18

C. m = 17 , n = - 8

D. m = 23 , n = - 19

Answer: B

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29. If $\left(x^{100} + 2x^{99} + k\right)$ is divisible by $(x+1)$ then the value of k is

A. 1

B. 2

C. -2

D. -3

Answer: A

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

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

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

C. 3

D. -3

Answer: D

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31. The zeros of the polynomial $p(x) = x^2 - 3x$ are

A. 0 , 0

B. 0 , 3

C. 0 , -3

D. 3 , -3

Answer: B

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32. The zeros of the polynomial $p(x) = 3x^2 - 1$ are

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

B. $\frac{1}{\sqrt{3}}$ and $\sqrt{3}$

C. $\frac{-1}{\sqrt{3}}$ and $\sqrt{3}$

D. $\frac{1}{\sqrt{3}}$ and $\frac{-1}{\sqrt{3}}$

Answer: D

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