MATHS

BOOKS - CALCUTTA BOOK HOUSE MATHS (BENGALI ENGLISH)

POLYNOMIALS

Examples

1. Which one of the following is not a polynomial ?

A. 0

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

C. $-a(a = \text{constant})$

D. $\sqrt{t}$, t = variable

Answer:

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2. Which one of the following is a polynomial of degree 0 ?

A. 0

B. $-k^2(k = \text{constant})$

C. x (x = variable)

D. $\sqrt{2t}$, (t = variable)

Answer:

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3. Which one of the followings is a linear polynomial of one variable ?

A. $\sqrt{5}x$

B. $2 - x - x^2$

C. x - y + xy

D. x^{n+2} (n = constant)

Answer:

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4. The degree of which one of the following polynomials is undefined ?

A. 0

B. -1

C. t + 1 (t = variable)

D. kt (k = constant)

Answer:

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5. Which one of the following is a quadratic polynomial of one variable ?

A. x + y - xy

B. x^{n+1} (n = least natural number)

C. a^2 (a = constant)

D. 2t (t = variable)

Answer:

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6. Which one of the following is a quadratic polynomial of two variables ?

A. x + y + xy

B. $x^2 + x + 1$

C. $2 - y - y^2$

D. $ax^2 + bx + c(a \neq 0)$

Answer:

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7. The co-efficient of x^2 of the polynomial 8x - 19 is

A. 0

B. 8

C. -19

D. None of these

Answer:

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8. The co-efficient of x^0 of the polynomial $\sqrt{11} - 3\sqrt{11x} + x^2$ is

A. no co-efficient

B. 0

C. $\sqrt{11}$

D. None of these

Answer:

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9. The binomials of one variable having degree 17 is

A. $x^{17} + y$

B. $y^{17} + 1$

C. $x^{17} + y^{17}$

D. $y - x^{17}$

Answer:

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10. $x + \frac{5}{x}$ is

A. a polynomial of one variable

B. a linear polynomial of one variable

C. a quadratic polynomial of one variable

D. not a polynomial

Answer:

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11. Find the degrees of the polynomials

(a) $5t - \sqrt{7}$ (b) 3

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12. What are the co-efficients of x^2 of the two given polnomials ?

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

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

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13. Given one example of a binomial of degree 35 and a monomial of degree 100 each.

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14. What do you mean by linear polynomials ? Give an example.

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15. Write which of the following algebraic expression are polynomials and also state the degree of those which are polynomials :

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

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16. Write which of the following algebraic expression are polynomials and also state the degree of those which are polynomials :

$y^2 + \sqrt{2}$

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17. Write which of the following algebraic expression are polynomials and also state the degree of those which are polynomials :

$y^3 - \frac{3}{4}y + \sqrt{7}$

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18. Write which of the following algebraic expression are polynomials and also state the degree of those which are polynomials :

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

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19. Write which of the following algebraic expression are polynomials and also state the degree of those which are polynomials :

$2x^6 - 4x^5 + 7x^2 + 3$

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20. Write which of the following algebraic expression are polynomials and also state the degree of those which are polynomials :

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

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21. Write which of the following algebraic expression are polynomials and also state the degree of those which are polynomials :

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

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22. Write which of the following algebraic expression are polynomials and also state the degree of those which are polynomials :

$x^{15} - 1$

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23. Write which of the following algebraic expression are polynomials and also state the degree of those which are polynomials :

$\sqrt[3]{t} + \frac{t}{27}$

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24. Write which of the following algebraic expression are polynomials and also state the degree of those which are polynomials :

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

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25. Write which of the following algebraic expression are polynomials and also state the degree of those which are polynomials :

0

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26. Write which of the following algebraic expression are polynomials and also state the degree of those which are polynomials :

15

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27. Write which of the following algebraic expression are polynomials and also state the degree of those which are polynomials :

$y^3 + 4$

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28. Write which of the following algebraic expression are polynomials and also state the degree of those which are polynomials :

$z + \frac{3}{z} + 2$

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29. Find the co-efficient as per directions given in the following polynomials :

The co-efficient of x^2 in the polynomial $2 + x + x^2$.

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30. Find the co-efficient as per directions given in the following polynomials :

The co-efficient of x^2 in the polynomial $2 - x^2 + x^3$.

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31. Find the co-efficient as per directions given in the following polynomials :

The co-efficient of x in the polynomial $x^2 - x + 2$.

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32. Find the co-efficient as per directions given in the following polynomials :

The co-efficient of x^3 in the polynomial $5x^3 - 13x^2 + 2$.

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33. Give two different examples of monomials of degree 4, having only one variable.

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34. Give two different examples of monomials of degree 3 having only one variable.

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35. Give an example of a binomial of degree 0.

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36. Give an example of a trinomial of degree 0.

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37. Write which of the following polynomials are linear, quadratic and cubic polynomials :

$x^2 + x$

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38. Write which of the following polynomials are linear, quadratic and cubic polynomials :

$x - x^3$

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39. Write which of the following polynomials are linear, quadratic and cubic polynomials :

r^2

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40. Write which of the following polynomials are linear, quadratic and cubic polynomials :

$y + y^2 + 4$

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41. Write which of the following polynomials are linear, quadratic and cubic polynomials :

3t

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42. Write which of the following polynomials are linear, quadratic and cubic polynomials :

$7x^3$

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43. Write which of the following polynomials are linear, quadratic and cubic polynomials :

1 + x

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44. Write which of the following polynomials are linear, quadratic and cubic polynomials :

$x^2 + y^2 + a^2$

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45. Write which of the following polynomials are linear, quadratic and cubic polynomials :

x + y + z

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46. Write which of the following polynomials are linear, quadratic and cubic polynomials :

x + y - xy

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47. Find the number of terms of each of the following binomials :

$(1+x)^2$

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48. Find the number of terms of each of the following binomials :

$(2+y)^3$

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49. Find the number of terms of each of the following binomials :

$(1+z)^{10}$

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50. Find the number of terms of each of the following binomials :

$(a+x)^{100}$

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51. Find the number of terms of each of the following binomials :

$\left(1+x^2\right)^q$

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52. Find the number of terms of each of the following binomials :

$\left(1+y^3\right)^7$

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53. Find the number of terms of each of the following binomials :

$\{(a-x)(a+x)\}^{20}$

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54. Find the number of terms of each of the following binomials :

$$\left(\frac{x+2x^2+x^3}{x}\right)^n$$

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55. If $p(x) = \frac{x^2-64}{x-8}$, then p(8) =

A. 1

B. 0

C. 16

D. Undefined

Answer:

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56. If $p(x) = x^2 + 9x - 6$, then p(0) =

A. -6

B. 0

C. 1

D. 4

Answer:

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57. If $f(x+1) = 2x^2 - 3x - 1$, then f(0) =

A. -1

B. -2

C. 0

D. 4

Answer:

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58. If f(x) = x when $0 \leq x < 1$

= 2 - x when $1 \leq x \leq 2$

= $x - \frac{x^2}{2}$ when $x > 2$, then f(1.5) =

A. 1.5

B. 0.5

C. 0.375

D. 1

Answer:

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59. If $f(x) = \frac{1-x}{1+x}$, then $f\left(\frac{1}{x}\right)$ =

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

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

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

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

Answer:

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60. If $f(x) = -6 + 10x - 7x^2$, then f(-1) =

A. -3

B. -6

C. -23

D. -9

Answer:

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61. The zero of the polynomial $p(x) = x^2 - 2x - 8$ is

A. -2

B. -1

C. 0

D. 1

Answer:

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62. What is the zero of p(x) = 2x - 3 ?

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

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

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

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

Answer:

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63. If p(x) = x + 4, then the value of [p(x) + p(-x)] is

A. -8

B. 8

C. 2x

D. $-2x$

Answer:

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64. The zero of the polynomial $f(x) = ax + b(a \neq 0)$ is

A. $\frac{a}{b}$

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

C. $-\frac{a}{b}$

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

Answer:

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65. If $(3x-1)^7 = a_7x^7 + a_6x^6 + a_5x^5 + \ldots\ldots + a_1x + a_0$, then find the value of $a_7 + a_6 + a_5 + \ldots\ldots\ldots + a_0$.

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66. If p(x) = 4, then find p(x) + P(-x).

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67. If $f(y) = \frac{y+1}{y+2}$, then find f(0) + f(-1).

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68. If $f(x) = \frac{2-x}{2+x}$, then determine $f\left(x^{-1}\right)$.

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69. If $f(x+2) = x^2 + 2x + 3$, then find f(x + 4).

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70. If $f\left(\frac{1}{y}\right) = \frac{2}{y} - \frac{1}{y^2}$ then find f(y).

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71. Find the zero of the polynomial $f(x) = x^2 - 3x + 2$.

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72. Determine the zeroes of the polynomial $p(x) = x^2 - 5x$.

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73. If f(x) = 0 when x is an integer.

= 2 when x is not an integer,

then find - (a) f(0), (b) $f\left(\sqrt{2}\right)$.

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74. If f(x) = 2x + 3, then x is rational.

$= x^2 + 1$, when x is irrational.

then find - (a) f(0), (b) $f(\pi)$.

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75. If f(x) = ax + b and f(0) = 3, f(2) = 5, then find the value of a and b.

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76. If $f(x) = ax^2 + bx + c$ and f(0) = 2, f(1) = 1, f(4) = 6, then find the valuse of a, b and c.

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77. If $f(x) = \frac{a(x-b)}{a-b} + \frac{b(x-a)}{b-a}$, then prove that f(a) + f(b) = a + b.

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78. If $f(x) = \frac{ax-b}{bx-a}$, then find the value of $f\left(\frac{1}{x}\right)$.

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79. If $f(x) = x^2 - 5x + 6$, then find $f(x^2+2)$.

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80. If $f(x) = 3^x$, then prove that f(x + 1) = 9f(x - 1).

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81. If $f(x) = x^9 - 6x^8 - 2x^7 + 12x^6 + x^4 - 7x^3 + 6x^2 + x - 3$, then find the value of f(6).

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82. If $f(x) = \log_3 x$ and $g(x) = x^2$, then prove that f(g(3)) = 2.

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83. If $P(x) = x^3 + ax^2 + 6x + a$ be divided by (x + a), the remainder is -

A. 5a

B. $-5a$

C. $-a$

D. a

Answer:

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84. If the polynomial $P(a) = x^2 - 2x + a$ be divided by (x - 3), the remainder is 0. Then a =

A. 0

B. -1

C. -3

D. 3

Answer:

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85. If

$f(x) = x^2 + ax - 2a^2 + 1, g(x) = x - a, q(x) = x + 2a$ and $f(x) = g(x$

then r(x) =

A. 1

B. 0

C. a

D. $-2a$

Answer:

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86. Using the remainder theorem, find the remainders when $x^3 - 3x^2 + 2x + 5$ is divided by (i) x + 2 and (ii) 2x + 1.

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87. Using remainder theorem, determine the remainders when the following polynomials are divided by (x - 1) :

(i) $x^3 - 3x^2 + 4x + 50$

(ii) $11x^3 - 12x^2 - x + 7$

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88. Find the remainders using remainder theorem, when

(i) $\left(x^3 - 6x^2 + 9x - 8\right)$ is divided by x - 3.

(ii) $\left(x^3 - ax^2 + 2x - a\right)$ is divided by x - a.

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89. Using the remainder theorem, examine whether (2x + 1) is a multiple of the polynomial $p(x) = 4x^3 + 4x^2 - x - 1$ or not.

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90. Find the value of a if the remainders, when both the polynomials $\left(ax^3+3x^2-3\right)$ and $\left(2x^3-5x+a\right)$ are divided by (x - 4), are the same.

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91. If the polynomials x^3+2x^2-px-7 and $x^3+px^2-12x+6$ be divided by (x + 1) and (x - 2) respectively, the remainders are r_1 and r_2 and if $2r_1+r_2=6$, then find the value of p.

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92. Find the remainders when

(i) $\left(x^3+3x^2+3x+1\right)$ is divided by $(x+\pi)$,

(ii) $\left(x^3-ax^2+6x-a\right)$ is divided by (x - a),

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93. Prove that $\left(3x^3 + 7x\right)$ is not a multiple of (7 + 3x).

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94. The polynomial $\left(px^2 + qx + r\right)$ is divisible by $\left(x^2 - 1\right)$ and if x = 0, the value of the polynomial is 2. Determine the values of p, q and r.

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95. If the polynomial $\left(x^3 + 4x^2 + 4x - 3\right)$ be divided by x, what should be the remainder.

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96. Identify the identities and the equations among the following statements :

$x^2 - (a - b)x + ab = 0$

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97. Identify the identities and the equations among the following statements :

$(x+y)(x-y)=x^2-y^2$

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98. Identify the identities and the equations among the following statements :

$x^2-\left(2a+\frac{1}{a}\right)x+2=0$

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99. Identify the identities and the equations among the following statements :

$ab=\left(\frac{a+b}{2}\right)^2-\left(\frac{a-b}{2}\right)^2$

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100. Find the root of the following equation of polynomial :

$p(x) = 2x + \sqrt{11}$

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101. Find the roots of each of the following equations of polynomials :

$p(x, y) = x^2 + y^2 - 2x + 1$

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102. Find the roots of each of the following equations of polynomials :

$p(x) = ax^2 + bx + c, a \neq 0$ and a, b, c are constants.

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103. Find the roots of each of the following equations of polynomials :

$$p(x) = x^2 - \frac{2}{p}(p^2 + 1)x + 4$$

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104. Find the root of the equation of the linear polynomial f(x) = 2x + 3.

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105. Show that if one of the roots of the equation of the quadratic polynomial $x^2 - 6ax - 91 = 0$ be 7, then the another root is (-13).

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106. If the polynomial $x^4 - 2x^3 + 3x^2 - ax + b$ be divided by (x -1) and (x + 1), the respective remainders are 5 and 19. Determine the remainder when the polynomial is divided by (x + 2).

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107. The polynomial $\left(x^3 + px^2 - x + q\right)$ is divisible by $\left(x^2 - 1\right)$ and when it is divided by (x - 2), the remainder is 15. Find the values of p and q.

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108. If for the polynomial f(x), $f\left(\frac{1}{2}\right)$ = 0, then one of the factors of f(x) is -

A. x - 1

B. x + 1

C. 2x - 1

D. 2x + 1

Answer:

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109. If the polynomial $p(x) = x^3 + 6x^2 + 4x + k$ is divisible by (x + 2), then k =

A. -6

B. -7

C. -8

D. -9

Answer:

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110. If (x - 1) is a factor of the polynomial f(x), but not a factor of the polynomial g(x), then (x - 1) is a factor of which one of the followings ?

A. f(x) - g(x)

B. f(x) + g(x)

C. f(x)g(x)

D. {f(x) + g(x)} g(x)

Answer:

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111. If $\left(n^2-1\right)$ be one of the factors of the polynomial $f(n)=an^4+bn^3+cn^2+dn+e$, then

A. a + c + e = b + d

B. a + b + e = c + d

C. a + b + c = d + e

D. b + c + d = a + e

Answer:

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112. (x + 1) will be a factor of the polynomial $p(x) = x^n + 1$, when

A. n is a positive integer

B. n is a negative integer

C. n is an even positive integer

D. n is an odd positive integer

Answer:

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113. If x be a factor of the polynomial p(x) = (x - 1) (x - 2) (x - 3), then p(0) =

A. 2

B. 3

C. 4

D. -6

Answer: -6

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114. If (x + 1) be a factor of the polynomial $p(x) = x^3 + k$, then k =

A. -1

B. 0

C. 1

D. 2

Answer:

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115. If one of the factors of the polynomial $p(x) = x^4 + x^2 - 20$ be $\left(x^2 + 5\right)$, then the other factor is

A. $x^2 + 4$

B. $x^2 - 4$

C. $x^2 - 1$

D. $x^2 - 5$

Answer:

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116. If $f(x) = kx^2 - 3x + k$ and g(x) = x - 1 be two polynomials, then g(x) will be a factor of f(x) when k =

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

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

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

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

Answer:

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117. Which one of the followings is a factor of the polynomial $p(x) = 4x^3 + 4x^2 - x - 1$?

A. 2x - 1

B. x

C. x + 1

D. 2x + 1

Answer:

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118. If (x - 1) be a factor of $\left(4x^2 - kx + 1\right)$, find the value of k.

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119. Determine whether n is an add or even positive integer, when (x + 1) is a factor of $(x^n - 1)$.

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120. If (x + a) be one of the factors of the polynomial $x^3 + ax^2 - 2x + a - 12$, then find the value of a.

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121. If (x - 3) be a factor of the polynomial $\left(k^2x^3 - kx^2 + 3kx - k\right)$, then find the value of k.

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122. Determine for which cases of the followings the polynomial g(x) will be a factor of f(x).

When $f(x) = 3x^3 + x^2 - 20x + 12$ and $g(x) = 3x - 2$,

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123. Determine for which cases of the followings the polynomial g(x) will be a factor of f(x).

When $f(x) = x^4 - x^2 - 12$ and $g(x) = x + 2$.

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124. Find the value of k if the polynomial $p(x) = 2x^4 + 3x^3 + 2kx^2 + 3x + 6$ is divisible (x + 2).

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125. Determine the values of a and b if $x^2 - 4$ is a factor of the polynomial $ax^4 + 2x^3 - 3x^2 + bx - 4$

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126. If n be any positive integer (even or odd), prove that (x - y) is a factor of the polynomial $x^n - y^n$.

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127. Prove that (x - y) can never be a factor of the polynomial $x^n + y^n$, where n is any positive integer (odd or even).

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128. If (x + 1) and (x + 2) be any two factors of the polynomial $\left(x^3 + 3x^2 + 2ax + b\right)$, then determine the value of a and b.

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129. Determine the values of a and b when the polynomial $\left(ax^3 + bx^2 + x - 6\right)$ is divided by (x - 2), the remainder is 4 and (x + 2) is a factor of the polynomial.

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130. Find the relation between p and r if (x - 2) and $\left(x-\frac{1}{2}\right)$ be two factors of the polynomial px^2+5x+r.

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131. If (x + b) be a common factor of both the polynomials $\left(x^2+px+q\right)$ and $\left(x^2+kx+m\right)$ then prove that $b=\frac{q-m}{p-1}$.

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132. Find the condition for which the polynomial $x^3+(a+b)x+p$ is divisible by (x + a + b).

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133. If both the polynomials $x^{41} + a$ and $x^{41} + b$ be divisible by (x + 1) prove that a + b = 2.

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134. If the polynomial $(x^n + 1)$ is divisible by both (x + a) and (x + b), then prove that n = 0.

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Exercise 1 1

1. If n be a whole number and $a_0, a_1, a_2, \ldots\ldots\ldots\ldots, a_n (a_n \neq 0)$ are constants, then the polynomial $p(x) = a_n x^n + a_{n-1} x^{n-1} + \ldots\ldots\ldots\ldots + a_1 x + a_0$ will be a zero polynomial, when

A. p(0) = 1

B. $p(a_0) = 0$

C. $p(a_n) = 0$

D. p(x) = 0

Answer:

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2. If $p(x) = a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \ldots\ldots\ldots\ldots + a_1 x + a_0$ where n is a whole number and $a_0, a_1, a_2, \ldots\ldots\ldots\ldots\ldots, a_n (a_n \neq 0)$ are all constants, then p(0) =

A. 0

B. 1

C. a_0

D. a_n

Answer:

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3. If $p(x) = a_n x^n + a_{n-1} x^{n-1} + \ldots\ldots\ldots\ldots + a_1 x + a_0$, where n is a whole number and $a_0, a_1, a_2, \ldots\ldots\ldots\ldots\ldots, a_{n-1}, a_n \neq 0$ are constants then p(1) =

A. a_0

B. $a_0 + a_1 + a_2 + \ldots\ldots\ldots\ldots + a_{n-1} + a_n$

C. 0

D. $a_{n-1} + a_n$

Answer:

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4. If $p(x) = a_n x^n + a_{n-1} x^{n-1} + \ldots\ldots\ldots\ldots + a_1 x + a_0$, where n is a whole number and $a_0 = a_1 = a_2 = \ldots\ldots\ldots\ldots\ldots = a_{n-1} = 0 \neq a_n$, then p(1) =

A. a_n

B. 1

C. 0

D. x^n

Answer:

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5. If x be an integer, then in which case of the followings, x will be a zero polynomial ?

A. $-1 < x < 0$

B. $0 < x < 1$

C. $-1 < x < 1$

D. $-1 > x > 1$

Answer:

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6. If p be an integer, then in which case of the followings, p will be a constant polynomial ?

A. $0 < p < 1$

B. $1 < p < 2$

C. $-1 < p < 0$

D. $9 < p < 11$

Answer:

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7. Which one of the followings is not a polynomial ?

A. 0

B. $x^{-n}, n < 0$

C. $\frac{y^3+1}{y^2-y+1}$

D. a, where $a^3 = x$ for a constant and x variable

Answer:

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8. Which one of the following is a quadratic polynomial of two variables ?

A. $x^2 + 1$

B. x + y - 1

C. x + y + xy

D. $x^2 + y^2 + 2x^2y^2$

Answer:

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9. Which one of the followings is a polynomial of degree 0 ?

A. 0

B. $-m^2$, (m = constant)

C. x^n, n is a natural number

D. $\sqrt[3]{t}$, is a variable

Answer:

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10. The degree of a constant polynomial is

A. 0

B. 1

C. both 0 and 1

D. neither 0 nor 1

Answer:

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11. The degree of the zero polynomial is

A. 0

B. 1

C. undefined

D. None of these

Answer:

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12. Give an example of a constant polynomial and of a zero polynomial each.

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13. What is called the degree of polynomials ?

What is the degree of a zero polynomial ?

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14. What are the two conditions for which the expression $p(x) = a_n x^n + a_{n-1} x^{n-1} + \ldots\ldots\ldots + a_1 x + a_0$ is a polynomial ?

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15. Is $\sqrt[3]{11}$ a polynomial ? Give reasons in favour of your answer.

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16. Write the standard form of the linear polynomial. Express x as the standard form.

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17. Write the standard form of quadratic polynomials. Express 1 as a quadratic polynomial as in the standard form.

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18. If m be a whole number, then determine the degree of the polynomial $\left(x^m + x^{m-1} + x^{m-2} + \ldots\ldots + x + 1\right)$. Also find the co-efficient of x^{m-3} of the polynomial.

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19. Determine the degree and number of terms of the polynomial $\left(\frac{x^3 - 1}{1 + x + x^2}\right)^{k+2}$ where k = 8.

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20. Define polynomials. Give two examples of polynomials.

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21. What do you mean by constant polynomials. Give two examples of constant polynomials.

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22. What is zero polynomials ? What is the degree of zero polynomials ? Write an example of zero polynomials.

Watch Video Solution

23. Determine which of the following algebraic expressions are polynomials and which are not. Also, determine the degrees of those expressions which are polynomials :

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

Watch Video Solution

24. Determine which of the following algebraic expressions are polynomials and which are not. Also, determine the degrees of those expressions which are polynomials :

$\frac{1}{z} - z + 1$

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25. Determine which of the following algebraic expressions are polynomials and which are not. Also, determine the degrees of those expressions which are polynomials :

$y^{-3} - y^{-1} + 2$

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26. Determine which of the following algebraic expressions are polynomials and which are not. Also, determine the degrees of those

expressions which are polynomials :

$\sqrt[3]{z} + \frac{z}{125}$

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27. Determine which of the following algebraic expressions are polynomials and which are not. Also, determine the degrees of those expressions which are polynomials :

$\frac{1}{\sqrt{7}}x^3 - 2\sqrt{7}x + \sqrt{2}$

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28. Determine which of the following algebraic expressions are polynomials and which are not. Also, determine the degrees of those expressions which are polynomials :

$\sqrt{2}$

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29. Determine which of the following algebraic expressions are polynomials and which are not. Also, determine the degrees of those expressions which are polynomials :

$$\frac{x-1}{\sqrt{x}+1}$$

Watch Video Solution

30. Determine which of the following algebraic expressions are polynomials and which are not. Also, determine the degrees of those expressions which are polynomials :

$$\frac{x^3-27}{x-3}$$

Watch Video Solution

31. Determine the co-efficients according to the directions given of the following polynomials :

The co-efficient of x^2 in the polynomial $\frac{1}{\sqrt{3}}x^3 - 2\sqrt{3}x + 1$,

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32. Determine the co-efficients according to the directions given of the following polynomials :

The co-efficient of x^2 in the polynomial 8y - 17 ,

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33. Determine the co-efficients according to the directions given of the following polynomials :

The co-efficient of x^0 in the polynomial $x^2 - \sqrt{18}$,

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34. Determine the co-efficients according to the directions given of the following polynomials :

The co-efficient of y in the polynomial $6y^3 - 7y + 10$,

Watch Video Solution

35. Determine the co-efficients according to the directions given of the following polynomials :

The co-efficient of z^0 in the polynomial $\frac{z^3-1}{z^2+z+1}$

Watch Video Solution

36. Determine the co-efficients according to the directions given of the following polynomials :

The co-efficient of u in the polynomial $\frac{u^2-11}{u+\sqrt{11}}$,

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37. Determine the co-efficients according to the directions given of the following polynomials :

The co-efficient of x in the polynomial $\frac{x^4+x^2+1}{x^2+x+1}$

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38. Determine the co-efficients according to the directions given of the following polynomials :

The co-efficient of t^0 in the polynomial {(1 + t)(1 - t)}p ,

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39. Determine the degrees of the following polynomials :

$x^m - 1$

Watch Video Solution

40. Determine the degrees of the following polynomials :

$$\frac{x^p - 1}{x - 1}$$

Watch Video Solution

41. Determine the degrees of the following polynomials :

$$\frac{x^4 + x^2y^2 + y^4}{x^2 - xy + y^2}$$

Watch Video Solution

42. Determine the degrees of the following polynomials :

$$\frac{7u^2 - 29}{\sqrt{7}u - \sqrt{29}}$$

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43. Determine which of the following polynomials are linear, quadratic and cubic polynomials :

$$\frac{t^4 + t^2 + 1}{t^2 - t + 1}$$

Watch Video Solution

44. Determine which of the following polynomials are linear, quadratic and cubic polynomials :

$$\frac{v^2 - 7}{v + \sqrt{7}}$$

Watch Video Solution

45. Determine which of the following polynomials are linear, quadratic and cubic polynomials :

$(1 - x)(1 + x + x^2)$

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46. Determine which of the following polynomials are linear, quadratic and cubic polynomials :

x + y

Watch Video Solution

47. Determine which of the following polynomials are linear, quadratic and cubic polynomials :

xy

Watch Video Solution

48. Determine which of the following polynomials are linear, quadratic and cubic polynomials :

$x^2 + y^2 + z^2 + 2xy$

Watch Video Solution

49. Give two examples of each of the following cases :

(i) (a) Monomials (b) Binomials (c) Trinomials of one variable having the degree 19.

(ii) (a) Monomials (b) Binomials (c) Trinomials of two variables having the degree 10.

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50. Determine the degrees and the number of terms of each of the following polynomials :

$(3+x)^{10}$

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51. Determine the degrees and the number of terms of each of the following polynomials :

$\{(1-\sqrt{x})(1+\sqrt{x})\}^t$, where t = 3

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52. Determine the degrees and the number of terms of each of the following polynomials :

$(1+3x+3x^2+x^3)^q$, where q = 2

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53. Determine the degrees and the number of terms of each of the following polynomials :

$\{(1-x)(1+x+x^2)\}^p$, when p = 10

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54. For what value of a, the polynomial (a - 1) x + 10 will reduce to a constant polynomial ?

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55. If the expression $(k^2-2k+1)y+\sqrt{17}$ be a constant polynomial, then prove that k = 1.

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56. If the polynomial $(a^2 - b^2)x^2 + 2abx + (a^2 + b^2)a, b, c$ are constants, be a linear polynomial, then prove that a = b.

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57. If the polynomial

$(a^2 + b^2 + c^2 - ab - bc - ca)x^2 + 2abcx + (a^2 + b^2 + c^2)$, where a, b, c are constants, be a linear polynomial, then prove that a = b = c.

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Exercise 1 2

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

A. 8

B. 7

C. 17

D. 12

Answer:

Watch Video Solution

2. If $p(x) = 2x^3 - x^2 + x + 4$, then p(0) =

A. 4

B. 2

C. 9

D. 10

Answer:

Watch Video Solution

3. If $p(x) = 4 + 3x - x^3 + 5x^6$, then p(3) =

A. 3645

B. 4

C. 3630

D. 3631

Answer:

Watch Video Solution

4. If $f(x) = \frac{x^2 - a^2}{x - a}$ then f(a) =

A. a

B. 2

C. 2a

D. Undefined

Answer:

Watch Video Solution

5. The zero of the polynomial f(x) = 7x + 2 is

A. $\frac{2}{7}$

B. $-\frac{2}{7}$

C. $\frac{7}{2}$

D. $-\frac{7}{2}$

Answer:

Watch Video Solution

6. If $f(x-2) = 2x^2 + 3x - 5$, then f(-1) =

A. 0

B. -5

C. -6

D. 1

Answer:

Watch Video Solution

7. If $f(x) = \begin{cases} 0, \text{ when x is an integer }, \\ 2, \text{ when x is not an integer}, \end{cases}$ then $f(\pi)$ =

A. a

B. 2

C. π

D. 2π

Answer:

Watch Video Solution

8. If $f(x) = \begin{cases} 2x+3, \text{ when x is an rational }, \\ x^2+1, \text{ when x is irrational}, \end{cases}$ then f(0) =

A. 0

B. 1

C. 2

D. 3

Answer:

Watch Video Solution

9. If $f(x) = \begin{cases} 2x^2+3 & \text{when } x \leq 2 \\ 2x+1 & \text{when } 2 < x \leq 3 \\ \frac{1}{2x-1} & \text{when } x > 3 \end{cases}$ then f(e) =

A. $2e^2 - 3$

B. 2e + 1

C. $\frac{1}{2e-1}$

D. None of these

Answer:

Watch Video Solution

10. If p(x + 1) = x + 4, then find the value of [p(1) + p(-1)] is

A. 8

B. 7

C. 6

D. 5

Answer:

Watch Video Solution

11. The zeros of the polynomial $p(x) = x^2 - 9$ are

A. 0, -9

B. 0, 3

C. 0, -3

D. 3, -3

Answer:

Watch Video Solution

12. If $(2x-1)^8 = a_8x^8 + a_7x^7 + a_6x^6 + \ldots\ldots\ldots + a_1x + a_0$, then find the value of $a_0 + a_1 + a_2 + \ldots\ldots\ldots + a_7 + a_8$.

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13. If $g(x-2) = x^2 - 4x + 5$, the determine - (a) g (x) and (b) g(x + 1).

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14. If $h(x) = \dfrac{x^3 - a^3}{x - a}$, then find h(a).

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15. If $f(x) = \frac{4+x}{4-x}$, then find $f\left(2^{-1}\right)$.

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16. If $f(x) = \frac{4^x}{4^x+2}$ then find f(x) + f(1 - x).

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17. If $f(x) = \frac{x}{2^x-1}$, then show that f(-1) = 2.

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18. What is the zero of the polynomial $p(x) = \frac{x^n-1}{2^x-1}$, where n is a natural number and $x \neq 0$?

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19. Determine the zeroes of the polynomial $p(x) = x^2 - 5x$.

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20. Find the zeroes of the polynomial $p(x) = x^2 - 5x + 4$.

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21. Determine f(x), when $f(x + 3) = 2x^2 - 3x - 1$.

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22. If $y = f(x) = \frac{ax + b}{cx - a}$, then find f(y).

Watch Video Solution

23. If $f(x) = 2^{ax+1}$, the determine $f(a) \cdot f(b) \cdot f(c)$.

Watch Video Solution

24. If $f(x) = x^2 - 5x + 6$, then determine $f\left(x^2 + 1\right)$.

Watch Video Solution

25. If $f(x) = 2^x$, then prove that f(x +1) = 4f(x - 1).

Watch Video Solution

26. If $f(x) = \frac{1-x}{1+x}$, then prove that $f(x) + f\left(\frac{1}{x}\right) = 0$.

Watch Video Solution

27. Find the zeroes of the polynomial $p(x) = x^2 - \left(a + \frac{1}{a}\right)x + 1$.

Watch Video Solution

28. If $f(x) = \log_2 x$ and $g(x) = x^2$ then find f(g(2)).

Watch Video Solution

29. If $f(x) = x^2$ and $g(x) = \sqrt{x}$, then prove that g(f(4)) = 4.

Watch Video Solution

30. If $f(x) = 4^x$, then prove that $\frac{f(x+1)}{f(x-1)} = 16$.

Watch Video Solution

31. The polynomial f(x) is defined by

$$f(x) = \begin{cases} 0 \text{ when x is an integer }, \\ 1 \text{ when x is not an integer }, \end{cases}$$

Then compute : $(a) f(-2), (b) f\left(\sqrt{3}\right)$.

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32. If the polynomial f(x) be defined by

$$f(x) = \begin{cases} 2x^2 - 3 & \text{when } x \leq 2 \\ 2x + 1 & \text{when } 2 < x \leq 4 \\ \frac{1}{2x-1} & \text{when } x > 4 \end{cases}$$

then find $(a) f\left(\sqrt{2}\right), (b) f(\pi)$.

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33. If f(x) = ax + b, f(0) = 2 and f(4) = 10, then find the values of a and b.

Watch Video Solution

34. If 2f(x) + 3f(-x) = 15 - 4x, then prove that f(x) = 3 + 4x.

Watch Video Solution

35. If $f(x) = ax^2 + bx + c$ and f(x + 1) = f(x) + x + 1, then determine the values of a and b.

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36. If $f(x) = ax^2 + bx + c$ and f(x - 1) = f(x) + 2x + 1. then find the values of a and b.

Watch Video Solution

37. If $f(x) = \frac{1}{4x^2}$, then proved that $\frac{f(x-h) - f(x+h)}{h} = \frac{x}{(x^2 - h^2)^2}$

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38. If $y = f(x) = \frac{2x + 3}{5x - a}$, then determine the value of a so that x = f(y).

Watch Video Solution

39. If $f(x) = \frac{x-1}{x+1}$, then prove that $\frac{f(x)-f(y)}{1+f(x)f(y)} = \frac{x-y}{1+xy}$.

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40. If $2f(x-1) - f\left(\frac{1-x}{x}\right) = x$, then prove that $3f(x) = 2(x+1) + \frac{1}{x+1}$.

Watch Video Solution

41. If $x > 0$, then prove that the value of the polynomial $\left(2x + 2^{-x} - 2\right)$ is positive.

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42. If $f(x) = \frac{x-a}{x} + \frac{x}{x-b}$, then find $f\left(\frac{a+b}{2}\right)$.

Watch Video Solution

43. If $3f(x) - f\left(\frac{1}{x}\right) = \log_e x^4 (x > 0)$, then prove that $f(e^x) = x$.

Watch Video Solution

44. If $f(x) = x^9 - 2x^8 - 2x^6 + 4x^5 + x^4 - 2x^3 + x - 1$, then find the value of f(2).

Watch Video Solution

45. If $f(x) = (a - x^n)^{\frac{1}{n}}, a > 0$ and n is a positive integer, then prove that f(f(x)) = x.

Watch Video Solution

Exercise 1 3

1. Which one of the followings is an identity ?

A. 4x - 3 = 0

B. $x^2 - \left(3a + \frac{1}{a}\right)x + 3 = 0$

C. $x^2 + y^2 = (x + y)^2 - 2xy$

D. $ax^2 + bx + c = 0, a \neq 0$

Answer:

Watch Video Solution

2. Which one of the followings is an equation ?

A. $x^2 - y^2 = (x + y)(x - y)$

B. $x^3 + y^3 = (x + y)^3 - 3xy(x + y)$

C. $xy = \left(\frac{x + y}{2}\right)^2 - \left(\frac{x - y}{2}\right)^2$

D. $x^2 + p = (p + 1)x$

Answer:

Watch Video Solution

3. The roots of the equation of the polynomial $p(x, y) = x^2 + y^2$ are-

A. 0, 1

B. 1, 0

C. 0, 0

D. None of these

Answer:

Watch Video Solution

4. If one of the roots of the equation of the polynomial $p(x) = x^2 - 7ax - 18$ be (-2), then a =

A. 0

B. 1

C. 7

D. 9

Answer:

Watch Video Solution

5. The number of roots of any linear polynomial is-

A. 1

B. 0

C. 2

D. None of these

Answer:

Watch Video Solution

6. If the polynomial $p(x) = 4x^4 + 4x^3 - 19x^2 - 16x + 12$ be divided by (x - 2), the remainder is

A. 12

B. 0

C. 2

D. 108

Answer:

Watch Video Solution

7. If the polynomial $p(x) = x^3 + 3x^2 + 3x + 1$ be divided by $(x - \pi)$, the remainder is

A. 1

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

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

D. $3\pi^3 + 1$

Answer:

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8. Determine the remainder when $\left(x^2 - 2\pi x + \pi\right)$ is divided by $(x - 2\pi)$

.

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9. If $q(t) = 4t^3 + 4t^2 - t - 1$ and $q\left(-\frac{1}{2}\right) = 0$, then determine the polynomial by which q(t) is divisible.

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10. Find the value of k if $p(x) = x^2 + kx + 6$ and $p(2) = 0$.

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11. Find the remainder if $f(x) = x^3 + 4x^2 + 4x - 3$ is divided by x.

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12. Determine the value of c if one of the roots of the equation of the polynomial $p(x) = ax^2 + bx + c, a \neq 0$ be 0.

Watch Video Solution

13. If $f(x) = x^2 - 4x + 14$, g(x) = x - 1, q(x) = x - 3 and f(x) = g(x) q(x) + r(x), then find r(x).

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14. Find the roots of the equation of the polynomial p(x) = cx + d.

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15. Determine the roots of the equation of the polynomial $f(x, y) = x^2 - y^2 + 6x + 9$.

Watch Video Solution

16. If the polynomial $p(x) = x^4 - a^2x^2 + 2x - a$ be divisible by (x + a), then calculate the value of a.

Watch Video Solution

17. If f(x) = (x - 7) q(x) + r(x), where $f(x) = x^3 - 7x^2 + 1$ and r(x) = 1, then find q(x).

Watch Video Solution

18. What is the vital difference between identity and equation ?

Watch Video Solution

19. What is meant by the root of an equation ? Find the root of the equation of the polynomial $p(x) = \sqrt{2}x + 10$.

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20. State and prove Remainder theorem.

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21. Find the value of k when one of the roots of the equation of the polynomial $p(x) = x^4 - kx^3 - 19x^2 - 46x - 8$ is 2.

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22. If the roots of the equation $x^3 + ax^2 - bx - 6 = 0$ be -1 and 2, calculate the value of a and b.

Watch Video Solution

23. If the roots of the equation of the polynomial $f(x) = x^3 + ax + b$ be -2 and 3, determine the value of a and b.

Watch Video Solution

24. If the root of the equation of the polynomial $p(x) = 8x^3 - px^2 - 4x + 2$ be $\frac{1}{2}$, then calculate the value of p.

Watch Video Solution

25. If the polynomial $f(x) = 2x^3 + ax^2 + bx - 2$ be divided by (2x - 3) and (x - 1), the respective remainders are 30 and 0. Calculate the values of

a and b.

Watch Video Solution

26. If the polynomial $p(x) = 4x^3 - px^2 + x - q$ be divided by (x - 1) and (x + 2), the respective remainders are 0 and 3. Find the value of p and q.

Watch Video Solution

27. Using the remainder theorem proved that (2x - 1) is a factor of the polynomial $\left(4x^3 - 4x^2 - x + 1\right)$.

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28. If the polynomials $f(x) = ax^2 - 3x + 5$ and $g(x) = x^2 - 2x + 2a$ be divided by (x - 3) the respective remainders are same. Find the value of a.

Watch Video Solution

29. The remainders, when the polynomials $f(x) = -ax^2 + 8x + 5$ and $g(x) = 2x^2 + x - 3a$ is divided by x - 1 respectively, are the same. Find the value of a.

Watch Video Solution

30. If the polynomial $p(x) = x^4 - 3x^3 + 2x^2 - ax + b$ be divided by (x - 1) and (x + 1), the respective remainders are 4 and 10. Then what will be the remainder when p(x) is divided by (x + 3) ?

Watch Video Solution

31. 0 and 4 are the respective remainders when the polynomial $p(x) = x^3 - px + q$ is divided by (x - 2) and (x + 2). What will be the remainder when p(x) is divided by x ?

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32. If the polynomials $f(x) = x^3 + kx - 3$ and $g(x) = x^3 - kx^2 + 2$ be divided by (x - 1) and (x - 2) respectively, the respective remainders are r_1 and r_2. Also, if $2r_1 + r_2 = 0$, then find the value of k.

Watch Video Solution

33. If the polynomials $f(x) = x^4 - a$ and $g(x) = a - x^4$ be divided by x and -x respectively, the respective remainders are r_1 and r_2. Also if $r_1 - r_2 = 0$, find the value of a.

Watch Video Solution

34. If the polynomials $f(x) = 2x^3 + x - k$ and $g(x) = 3x^3 + kx - 1$ be such that f(x) : g(x) = 2 : 3 and if (x - 1) be the common factor of both of them, then prove that k = 1.

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35. If the ratio of the respective remainders, when the polynomials $f(x) = 2x^4 + 3x^3 - x + k$ and $g(x) = 3x^4 + 2x^3 + 2kx - 7$ is divided by (x - 1), be 3 : 4, then prove that k = 11.

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36. If the polynomial $f(x) = x^2 + kx - 1$ be divided by (x - 2) and (x - 3), the respective remainders are r_1 and r_2, then prove that $3r_1 - 2r_2 + 7 = 0$.

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Exercise 1 4

1. If p(x) be a polynomial such that $p\left(-\frac{a}{b}\right) = 0$, then one of the factor of p(x) is

A. ax + b

B. bx + a

C. $x - \frac{a}{b}$

D. $x + \frac{a}{b}$

Answer:

Watch Video Solution

2. If the polynomial $f(x) = 2x^3 + kx^2 + 11x + k + 3$ be divisible by (2x - 1), then the value of k =

A. -1

B. -3

C. -5

D. -7

Answer:

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3. If (x - a) be a factor of f(x), but is not a factor of g(x), where both f(x) and g(x) are polynomials, then (x - a) will be a factor of which one of the following polynomials ?

A. f(x) - g(x)

B. f(x) + g(x)

C. f(x)g(x)

D. {f(x) + g(x)} g(x)

Answer:

Watch Video Solution

4. If $(x^2 - 1)$ be a factor of the polynomial $f(x) = ax^4 + bx^3 + cx^2 + dx + e$, then which of the followings is true ?

A. b + c + d = a + e

B. a + c + e = b + d

C. a + b + e = c + d

D. a + b + c = d + e

Answer:

Watch Video Solution

5. (x + a) will be a factor of the polynomial $p(x) = x^n + a^n$, when-

A. n is an odd positive integer

B. n is a negative integer

C. n is an even positive integer

D. n is a positive integer

Answer:

Watch Video Solution

6. If x be a factor of the polynomial f(x) = (x - a) (x + b) (x - c), then f(0) =

A. abc

B. 0

C. 1

D. $-abc$

Answer:

Watch Video Solution

7. If $\left(x+\sqrt{11}\right)$ be a factor of $f(x)=x^3+k$, then k =

A. -11

B. $11\sqrt{11}$

C. $-11\sqrt{11}$

D. 11

Answer:

Watch Video Solution

8. If $\left(x^2+r\right)$ be a factor of the polynomial $f(x)=x^3-rx^2+rx-r^2$, then the other factor is

A. x^2-r

B. x - r

C. x + r

D. $x-r^2$

Answer:

Watch Video Solution

9. If $f(x)=2x^3+9x^2+x+k$ and g(x) = x -1 be two polynomials, then g(x) will be factor of f(x) when k =

A. -12

B. 12

C. -1

D. 1

Answer:

Watch Video Solution

10. Which one of the followings is a factor of the polynomial $p(x) = x^4 - 1$?

A. $-x^4$

B. x^4

C. x + 1

D. x - 2

Answer:

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11. Find the value of a if (1 - 2x) is a factor of the polynomial $\left(2x^4 - ax^3 + 4x^2 + 2x + 1\right)$.

Watch Video Solution

12. Find the value of k if (x - 2) is a factor of the polynomial $\left(2x^5 - 6x^4 - 2kx^3 + 6kx^2 + 4kx + 8\right)$.

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13. If (x + 1) be a factor of the polynomial $\left(x^{43} + kx + 2\right)$, determine the value of k.

Watch Video Solution

14. If (x + 1) be a factor of the polynomial $\left(x^{200}+2x^{201}+k\right)$, then determine the value of k.

Watch Video Solution

15. If n be an odd negative integer, then prove that (x + 1) is a polynomial of degree (x^n+1).

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16. Prove that the polynomial $\left(x^5-y^5\right)$ is not divisible be (x + y).

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17. Is the polynomial $\left(x^{101}+1\right)$ divisible by (x + 1) ? Give reasons in favour of your answer.

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18. Examine whether (x + y) is a factor of the polynomial $\left(x^{11}+y^{11}\right)$ or not.

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19. If (x + 2y) be a factor of the polynomial $\left(x^2+4xy+4y^2\right)$, find the other factor.

Watch Video Solution

20. If $\left(x-\sqrt{11}\right)$ be a factor of the polynomial of f(x), but not a factor of g(x), then examine whether $\left(x-\sqrt{11}\right)$ is a factor of f(x) g(x) or not.

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21. Determine whether (x + 1) is a factor of the follwing polynomials or not :

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

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22. Determine whether (x + 1) is a factor of the follwing polynomials or not :

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

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23. Determine whether (x + 1) is a factor of the follwing polynomials or not :

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

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24. Determine whether (x + 1) is a factor of the follwing polynomials or not :

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

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25. Using factor theorem, examine whether g(x) is a factor of f(x) of the following polynomials or not :

$f(x) = x^4 - x - 18 \text{ and } g(x) = x + 2.$

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26. Using factor theorem, examine whether g(x) is a factor of f(x) of the following polynomials or not :

$f(x) = 2x^3 + 10x^2 - 7x - 456 \text{ and } g(x) = x - 5.$

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27. Using factor theorem, examine whether g(x) is a factor of f(x) of the following polynomials or not :

$f(x) = x^3 - 7x^2 + 24x + 162$ and $g(x) = x + 3$

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28. Using factor theorem, examine whether g(x) is a factor of f(x) of the following polynomials or not :

$f(x) = 4x^3 + x^2 - 20x - 7$ and $g(x) = 3x + 2$

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29. Determine the value of k for which g(x) is a factor of f(x) of the following given polynomials :

$f(x) = 2x^4 + 3x^3 - kx^2 + x - 6$ and $g(x) = 2x + 3.$

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30. Determine the value of k for which g(x) is a factor of f(x) of the following given polynomials :

$f(x) = x^3 + 2kx^2 - 11x + k - 5$ and $g(x) = 2x + 1$.

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31. Determine the value of k for which the polynomial $\left(2x^4 - 3x^3 - x^2 + x + k\right)$ is divisible by (2x - 1).

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32. Determine the value of k for which the polynomial $\left(2x^4 - 3x^3 - x^2 + x + k\right)$ is divisible by (2x + 3).

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33. If $\left(x^2 - 2\right)$ be a factor of the polynomial $\left(ax^3 - bx^2 - 4\right)$, find the values of a and b.

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34. If m, n be natural numbers and $\left(x^2 - n\right)$ be a factor of the polynomial $\left(ax^{2m} + bx^{2m+1} - 1\right)$, then prove that $a = \left(\frac{1}{n}\right)^m$ and $b = 0$.

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35. If (x - 1) and (x - 3) be two factors of the polynomial $\left(x^3 - 3x^2 + 2ax - b\right)$, find the values of a and b.

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36. If x+a is a factor of $x^2 + px + q$ and $x^2 + mx + n$, show that a= $\frac{n - q}{m - p}$.

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37. If the polynomial $\left(ax^3 + bx^2 - x + 6\right)$ be divided by (x + 2), the remainder is (-3) and if (x - 1) is a factor of this polynomial, then find the values of a and b.

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38. If the polynomial $\left(ax^p + bx^q - 3\right)$ be divided by (x - a) and (x - b), the remainder in both the cases is (-1). Prove that $\frac{a^{p+1} - b^{q+1}}{b^{p-1} - a^{q-1}} = ab$

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39. Prove that the polynomial $\left(x^{10} - y^{10}\right)$ is divisible by (x + y).

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40. Prove that the polynomial $\left(x^{99} - y^{99}\right)$ is not divisible by (x + y).

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41. Prove that the polynomial $\left(x^{100} - a^{100}\right)$ is divisible by (x + a), but not divisible by (x - a).

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42. Prove that the polynomial $\left(x^{81} - 2^{81}\right)$ is not divisible by (x + 2), but is divisible by (x - 2).

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43. Show that the polynomial $\left(x^{70} + 1\right)$ is not divisible by (x - 1)

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44. Show that the polynomial $\left(x^{71} + 1\right)$ is not divisible by (x - 1), but is divisible by (x + 1).

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45. Prove that the polynomial $\left(x^{-17}+1\right)$ is not divisible by (x - 1), but is divisible by (x + 1).

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46. Prove that the polynomial $\left(x^{-19}+y^{-19}\right)$ is not divisible by (x - y), but is divisible by (x + y).

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47. If (x + p) be a common factor of both the polynomials $\left(x^2+ax+b\right)$ and $\left(x^2+cx+d\right)$, then prove that $p=\frac{b-d}{a-c}$.

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48. What is the condition that the polynomial $\{x^2 + (p+q)x + r\}$ is divisible by (x + p + q)?

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49. Determine the condition for which the polynomial $x^3 + (p-q)x + r$ is divisible by (x + p + q).

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50. Determine the relation between c and d if (x - 2) and $\left(x - \frac{1}{2}\right)$ be the two factors of the polynomial $cx^2 + 5x + d$.

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51. If the ratio of the remainders when the polynomial $\left(x^{2m} + 1\right)$ is successively divided by (x + a) and (x + b), be b : a, prove that

$\frac{a^n - b^n}{b - a} = 1$, where n = 2m + 1 and $m \in N$.

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52. Determine the value of k if the ratio of the two remainders, obtained by dividing the polynomial $\left(x^3 + kx + 2\right)$ by (x + 2) and (x + 3) respectively, be 1 : 7.

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