



MATHS

BOOKS - PSEB

POLYNOMIALS

Exercise

1. Which of the following expressions are polynomials in one variable and which are not? State reasons for your answer:- $4x^2 - 3x + 7$

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2. Which of the following expressions are polynomials in one variable and which are not? State reasons for your answer:- $y^2 + \sqrt{2}$

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3. Which of the following expressions are polynomials in one variable and which are not? State reasons for your answer:- $3\sqrt{t} + t\sqrt{2}$

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4. Which of the following expressions are polynomials in one variable and which are not? State reasons for your answer:- $y + \frac{2}{y}$

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5. Which of the following expressions are polynomials in one variable and which are not? State reasons for your answer:- $x^{10} + y^3 + t^{50}$

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6. Write the coefficients of x^2 in each of the following: $2 + x^2 + x$

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7. Write the coefficients of x^2 in each of the following: $2 - x^2 + x^3$

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8. Write the coefficients of x^2 in each of the following: $\frac{\pi}{2}x^2 + x$

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9. Write the coefficients of x^2 in each of the following: $\sqrt{2}x - 1$

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10. Give one example each of a binomial of degree 35, and of a monomial of degree 100.

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11. Write the degree of each of the following polynomials:

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

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12. Write the degree of each of the following polynomials: $4 - y^2$

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13. Write the degree of each of the following polynomials: $5t - \sqrt{7}$

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14. Write the degree of each of the following polynomials: 3

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15. Classify the following as linear, quadratic and cubic polynomial :

$$x^2 + x.$$

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16. Classify the following as linear, quadratic and cubic polynomials:

$$x - x^3$$

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17. Classify the following as linear, quadratic and cubic polynomial :

$$y + y^2 + 4.$$

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18. Classify the following as linear, quadratic and cubic polynomial :

$$1 + x.$$

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19. Classify the following as linear, quadratic and cubic polynomial : $3t$.

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20. Classify the following as linear, quadratic and cubic polynomial : r^2 .

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21. Classify the following as linear, quadratic and cubic polynomial : $7x^3$

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22. Find the value of the polynomial $5x - 4x^2 + 3$ at $x = 0$.



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23. Find the value of the polynomial $5x - 4x^2 + 3$ at $x = -1$.



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24. Find the value of the polynomial $5x - 4x^2 + 3$ at $x = 2$.



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25. Find $p(0)$, $p(1)$ and $p(2)$ for the following polynomial :

$$p(y) = y^2 - y + 1.$$



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26. Find $p(0)$, $p(1)$ and $p(3)$ for each of the following polynomials:

$$p(t) = 2 + t + 2t^2 - t^3$$

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27. Find $p(0)$, $p(1)$ and $p(4)$ for each of the following polynomials:

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

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28. Find $p(0)$, $p(1)$ and $p(5)$ for each of the following polynomials:

$$p(x) = (x - 1)(x + 1)$$

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29. Verify whether the following is zero of the polynomial, indicated against it : $p(x) = 3x + 1$, $x = -\frac{1}{3}$.

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30. Verify whether the following is zero of the polynomial, indicated against it : $p(x) = 5x - \pi$, $x = \frac{4}{5}$.

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31. Verify whether the following is zero of the polynomial, indicated against it : $p(x) = x^2 - 1$, $x = 1, -1$.

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32. Verify whether the following is zero of the polynomial, indicated against it : $p(x) = (x + 1)(x - 2)$, $x = -1, 2$.



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33. Verify whether the following is zero of the polynomial, indicated against it : $p(x) = x^2$, $x = 0$.



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34. Verify whether the following is zero of the polynomial, indicated against it : $p(x) = lx + m$, $x = -\frac{m}{l}$.



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35. Verify whether the following is zero of the polynomial, indicated against it : $p(x) = 3x^2 - 1$, $x = -\frac{1}{\sqrt{3}}$, $\frac{2}{\sqrt{3}}$.



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36. Verify whether the following is zero of the polynomial, indicated against it : $p(x) = 2x + 1$, $x = \frac{1}{2}$.

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37. Find the zero of the polynomial in the following : $p(x) = x + 5$ is real number.

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38. Find the zero of the polynomial in the following : $p(x) = x - 5$ is real number.

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39. Find the zero of the polynomial in the following : $p(x) = 2x + 5$ is real number.

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40. Find the zero of the polynomial in the following : $p(x) = 3x$ is real number.

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41. Find the zero of the polynomial in the following : $p(x) = 3x$ is real number.

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42. Find the zero of the polynomial in the following : $p(x) = ax, a \neq 0$ is real number.

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43. Find the zero of the polynomial in the following :

$$p(x) = cx + d, c \neq 0, c, d \text{ is real number.}$$

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44. On dividing $x^3 + 3x^2 + 3x + 1$ by $x + 1$ we get remainder :

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45. On dividing $x^3 + 3x^2 + 3x + 1$ by x we get remainder :

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46. On dividing $x^3 + 3x^2 + 3x + 1$ by x we get remainder :

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47. On dividing $x^3 + 3x^2 + 3x + 1$ by $x + \pi$ we get remainder :

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48. On dividing $x^3 + 3x^2 + 3x + 1$ by $5 + 2x$ we get remainder :

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49. On dividing $x^3 - ax^2 + 6x - a$ by $x - a$ we get remainder :

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

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51. For which of the following polynomials is $x + 1$ is a factor ?



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52. Determine which of the following polynomials has $(x + 2)$ a factor :

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



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53. Determine which of the following polynomials has $(x + 3)$ a factor :

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



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54. Determine which of the following polynomials has $(x + 4)$ a factor :

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



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55. Use the Factor Theorem to determine whether $g(x)$ is a factor of $p(x)$ in each of the following cases:

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

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56. Use the Factor Theorem to determine whether $g(x)$ is a factor of $p(x)$ in each of the following cases:

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

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57. Use the Factor Theorem to determine whether $g(x)$ is a factor of $p(x)$ in each of the following cases:

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

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58. Find the value of k , if $x - 1$ is a factor of $p(x)$ of the following case

$$: p(x) = x^2 + x + k.$$

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59. Find the value of k , if $x - 2$ is a factor of $p(x)$ in each of the following

$$\text{cases: } p(x) = 2x^2 + kx + \sqrt{2}$$

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60. Find the value of k , if $x - 3$ is a factor of $p(x)$ in each of the following

$$\text{cases: } p(x) = kx^2 - \sqrt{2}x + 1$$

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61. Find the value of k , if $x - 4$ is a factor of $p(x)$ in each of the following

$$\text{cases: } p(x) = kx^2 - 3x + k$$

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62. The factors of $12x^2 - 7x + 1$ are :

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63. Factorise : $2x^2 + 7x + 3$.

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64. The factors of $6x^2 + 5x - 6$ are :

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65. Factorise : $3x^2 - x - 4$.

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66. The factors of $x^3 - 2x^2 - x + 2$ are :

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67. Factorise : $x^3 - 3x^2 - 9x - 5$.

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68. Factorise : $x^3 + 13x^2 + 32x + 20$.

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69. Factorise : $2y^3 + y^2 - 2y - 1$.

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70. Use the suitable identity to find the following product :

$$(x + 4)(x + 10).$$

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71. Use the suitable identity to find the following product :

$$(x + 8)(x - 10).$$

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72. Use the suitable identity to find the following product :

$$(3x + 4)(3x - 5).$$

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73. Use the suitable identity to find the following product :

$$\left(y^2 + \frac{3}{2}\right)\left(y^2 - \frac{3}{2}\right).$$

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74. Use the suitable identity to find the following product :

$$(3 - 2x)(3 + 2x).$$

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75. Evaluate the following product without multiplying directly :

$$103 \times 107.$$

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76. Evaluate the following product without multiplying directly :

$$95 \times 96.$$

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77. Evaluate the following product without multiplying directly :

$$104 \times 96.$$

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78. Factorise the following using appropriate identities :

$$9x^2 + 6xy + y^2.$$

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79. Factorise the following using appropriate identities : $4y^2 - 4y + 1$.

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80. Factorise the following using appropriate identities : $x^2 - \frac{y^2}{100}$.

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81. Expand the following using suitable Identities : $(x + 2y + 4z)^2$.

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82. Expand the following using suitable Identities : $(2x - y + z)^2$.

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83. Expand the following using suitable Identities : $(-2x + 3y + 2z)^2$.

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84. Expand the following using suitable Identities : $(3a - 7b - c)^2$.

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85. Expand the following using suitable Identities : $(-2x + 5y - 3z)^2$

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86. Expand the following using suitable Identities : $\left[\frac{1}{4}a - \frac{1}{2}b + 1\right]^2$.

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87. Factorise : $4x^2 + 9y^2 + 16z^2 + 12xy - 24yz - 16xz$.

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88. गटनर्षडीकरट करे:- $2x^2 + y^2 + 8z^2 - 2\sqrt{2}xy + 4\sqrt{2}yz - 8xz$

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89. Write the following cube in expanded : $(2x + 1)^3$.

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90. Write the following cube in expanded : $(2a - 3b)^3$.

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91. Write the following cube in expanded : $\left[\frac{3}{2}x + 1\right]^3$.

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92. Write the following cube in expanded : $\left[x - \frac{2}{3}y\right]^3$.

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93. Evaluate the following using suitable identity : $(99)^3$.

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94. Evaluate the following using suitable identity : $(102)^3$.

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95. Evaluate the following using suitable identity : $(998)^3$.

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96. Factorise the following : $8a^3 + b^3 + 12a^2b + 6ab^2$.

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97. Factorise each of the following: $8a^3 - b^3 - 12a^2b + 6ab^2$

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98. Factorise the following : $27 - 125a^3 - 135a + 225a^2$.

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99. Factorise the following : $64a^3 - 27b^3 - 144a^2b + 108ab^2$.

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100. Factorise the following : $27p^3 - \frac{1}{216} - \frac{9}{2}p^2 + \frac{1}{4}p$.

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101. ਜਾਂਚ ਕਰੋ:- $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$

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102. ਜਾਂਚ ਕਰੋ:- $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$

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103. Factorise the following : $27y^3 + 125z^3$.

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104. Factorise the following : $64m^3 - 343n^3$.

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105. Factorise : $27x^3 + y^3 + z^3 - 9xyz$.

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106.

ਜਾਂਚ

ਕਰੋ:-

$$x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x + y + z) \left[(x - y)^2 + (y - z)^2 + (z - x)^2 \right]$$

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107. If $x + y + z = 0$, show that $x^3 + y^3 + z^3 = 3xyz$.

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108. Without actually calculating the cubes, find the value of each of the following: $(-12)^3 + (7)^3 + (5)^3$

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109. Without actually calculating the cubes, find the value of each of the following: $(28)^3 + (-15)^3 + (-13)^3$

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110. Give possible expressions for the length and breadth of each of the following rectangles, in which their areas are given: Area : $25a^2 - 35a + 12$

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111. Give possible expressions for the length and breadth of each of the following rectangles, in which their areas are given: Area : $35y^2 + 13y - 12$

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112. What are the possible expressions for the dimensions of the cuboids whose volumes are given below? Volume : $3x^2 - 12x$

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113. What are the possible expressions for the dimensions of the cuboids whose volumes are given below? Volume : $12ky^2 + 8ky - 20k$

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1. Find the degree of the polynomials given below: $x^5 - x^4 + 3$

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2. Find the degree of the polynomials given below: $2 - y^2 - y^3 + 2y^8$

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3. Find the degree of the polynomials given below: 2

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4. Find the value of the following polynomial at the indicated value of variable : $p(x) = 5x^2 - 3x + 7$ at $x = 1$.

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5. Find the value of the following polynomials at the indicated value of variables: $q(y) = 3y^3 - 4y + \sqrt{11}$ at $y = 2$.

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6. Find the value of the following polynomials at the indicated value of variables: $p(t) = 4t^4 + 5t^3 - t^2 + 6$ at $t = a$.

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7. Check whether -2 and 2 are zeroes of the polynomial $x + 2$.

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8. Find a zero of the polynomial $p(x) = 2x + 1$.

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9. Verify whether 2 and 0 are zeroes of the polynomial $x^2 - 2x$.

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10. Divide $p(x)$ by $g(x)$, where $p(x) = x + 3x^2 - 1$ and $g(x) = 1 + x$.

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11. Divide the polynomial $3x^4 - 4x^3 - 3x - 1$ by $x - 1$.

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12. Find the remainder obtained on dividing $p(x) = x^3 + 1$ by $x + 1$.

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13. Find the remainder when $x^4 + x^3 - 2x^2 + x + 1$ is divided by $x - 1$.

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14. Check whether the polynomial $q(t) = 4t^3 + 4t^2 - t - 1$ is a multiple of $2t + 1$.

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15. Examine whether $x + 2$ is a factor of $x^3 + 3x^2 + 5x + 6$ and of $2x + 4$.

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16. Find the value of k , if $x - 1$ is a factor of $4x^3 + 3x^2 - 4x + k$.

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17. Factorise $6x^2 + 17x + 5$ by splitting the middle term method.

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18. Factorise $y^2 - 5y + 6$ by using the Factor Theorem.

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19. Factorise $x^3 - 23x^2 + 142x - 120$.

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20. Find the following product using appropriate identities:

$$(x + 3)(x + 3)$$

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21. Find the following product using appropriate identities:

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

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22. Evaluate 105×106 without multiplying directly.

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23. Factorise: $49a^2 + 70ab + 25b^2$

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24. Factorise: $\frac{25}{4}x^2 - \frac{y^2}{9}$

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25. Write $(3a + 4b + 5c)^2$ in expanded form.

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26. Expand $(4a - 2b - 3c)^2$.

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27. Factorise $4x^2 + y^2 + z^2 - 4xy - 2yz + 4xz$.

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28. Write the following cube in the expanded form: $(3a + 4b)^3$

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29. Write the following cube in the expanded form: $(5p - 3q)^3$



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30. Evaluate the following using suitable identities: $(104)^3$



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31. Evaluate the following using suitable identities: $(999)^3$



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32. Factorise $8x^3 + y^3 + 12x^2y + 6xy^2$



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33. Factorise : $8x^3 + y^3 + 27z^3 - 18xyz$



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