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Q1. Find a zero of the polynomial $p(x) = 2x + 1$.

Q2. Write the following cubes in the expanded form: $(3a + 4b)^2$.

Q3. Write the following cubes in the expanded form: $(5p - 3q)^3$.

Q4. Write the coefficient of x^2 in the following: $2 + x^2 + x$.

Q5. Write the coefficient of x^2 in the following: $2 - x^2 + x^3$.

Q6. Write the coefficient of x^2 in the following: $\frac{\pi}{2}x^2 + x$.

Q7. Write the coefficient of x^2 in the following: $\sqrt{2}x - 1$.

Q8. Write the degree of the following polynomial: $5x^3 + 4x^2 + 7x$.

Q9. Write the degree of the following polynomial: $4 - y^2$.

Q10. Write the degree of the following polynomial: $5t - \sqrt{7}$.

Q11. Write the degree of the following polynomial: 3.

Q12. Classify the following as linear, quadratic and cubic polynomial: $1 + x$.

Q13. Verify whether the following are zero of the polynomial, indicated against them.

$$p(x) = 5x - \pi, \quad x = \frac{4}{5}.$$

Q14. Verify whether the following are zero of the polynomial, indicated against them.

$$p(x) = 3x + 1, \quad x = -\frac{1}{3}.$$

Q15. Verify whether the following are zero of the polynomial, indicated against them.

$$p(x) = x^2, \quad x = 0.$$

Q16. Verify whether the following are zero of the polynomial, indicated against them.

$$p(x) = 2x + 1, \quad x = \frac{1}{2}.$$

Q17. Find the remainder when $x^3 + 3x^2 + 3x + 1$ is divided by x.

Q18. Use suitable identitie to find the following product: $(3 - 2x)(3 + 2x)$.

Q19. Use suitable identitie to find the following product: $(3x + 4)(3x - 5)$.

Q20. Use suitable identitie to find the following product: $(x + 4)(x + 10)$.

Q21. Use suitable identitie to find the following product: $(x + 8)(x - 10)$.

Q22. Verify whether 2 and 0 are zeroes of the polynomial $x^2 - 2x$.

Q23. Check whether -2 and 2 are zeroes of the polynomial $x + 2$.

Q24. Divide $p(x)$ by $g(x)$, where $p(x) = x + 3x^2 - 1$ and $g(x) = 1 + x$.

Q25. Divide the polynomial $3x^4 - 4x^3 - 3x - 1$ by $x - 1$.

Q26. Find the remainder obtained on dividing $p(x) = x^3 + 1$ by $x + 1$.

Q27. Find the remainder when $x^4 + x^3 - 2x^2 + x + 1$ is divided by $x - 1$.

Q28. Check whether the polynomial $q(t) = 4t^3 + 4t^2 - t - 1$ is a multiple of $2t + 1$.

Q29. Factorise $y^2 - 5y + 6$ by using the Factor Theorem.

Q30. Evaluate 105×106 without multiplying directly.

Q31. Write $(3a + 4b + 5c)^2$ in expanded form.

Q32. Expand $(4a - 2b - 3c)^2$.

Q33. Factorise $4x^2 + y^2 + z^2 - 4xy - 2yz + 4xz$.

Q34. Give one example each of a binomial of degree 35, and of a monomial of degree 100.

Q35. Find the remainder when $x^3 - ax^2 + 6x - a$ is divided by $x - a$.

Q36. Check whether $7 + 3x$ is a factor $3x^3 + 7x$.

Q37. If $x + y + z = 0$, show that $x^3 + y^3 + z^3 = 3xyz$.

Q38. Factorise : $49a^2 + 70ab + 25b^2$.

Q39. Factorise:

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

Q40. Evaluate the following using suitable identities: $(104)^3$.

Q41. Evaluate the following using suitable identities: $(999)^3$.

Q42. Given expression is polynomial in one variable or not? State reasons for your answer.

$$4x^2 - 3x + 7.$$

Q43. Given expression is polynomial in one variable or not? State reasons for your answer.

$$y^2 + \sqrt{2}.$$

Q44. Given expression is polynomial in one variable or not? State reasons for your answer.

$$3\sqrt{t} + t\sqrt{2}.$$

Q45. Given expression is polynomial in one variable or not? State reasons for your answer.

$$y + \frac{2}{y}.$$

Q46. Given expression is polynomial in one variable or not? State reasons for your answer.

$$x^{10} + y^3 + t^{50}.$$

Q47. Classify the following as linear, quadratic and cubic polynomials:

(i) $x - x^3$ (ii) r^2

Q48. Classify the following as linear, quadratic and cubic polynomials:

(i) $x^2 + x$ (ii) $3t$

Q49. Classify the following as linear, quadratic and cubic polynomials:

(i) $y + y^2 + 4$ (ii) $7x^3$

Q50. Verify whether the following are zero of the polynomial, indicated against them.

$$p(x) = x^2 - 1, \quad x = 1, -1.$$

Q51. Verify whether the following are zeros of the polynomial, indicated against them.

$$p(x) = (x + 1)(x - 2), \quad x = -1, 2.$$

Q52. Verify whether the following are zero of the polynomial, indicated against them.

$$p(x) = lx + m, \quad x = -\frac{m}{l}.$$

Q53. Verify whether the following are zero of the polynomial, indicated against them.

$$p(x) = 3x^2 - 1, \quad x = -\frac{1}{\sqrt{3}}, \frac{2}{\sqrt{3}}.$$

Q54. Find the zero of the polynomial in each of the following cases:

(i) $p(x) = x - 5$ (ii) $p(x) = 3x$

Q55. Find the zero of the polynomial in each of the following cases:

(i) $p(x) = 2x + 5$ (ii) $p(x) = ax, \ a \neq 0$

Q56. Find the remainder when $x^3 + 3x^2 + 3x + 1$ is divided by $x + 1$.

Q57. Find the remainder when $x^3 + 3x^2 + 3x + 1$ is divided by $x - \frac{1}{2}$.

Q58. Find the remainder when $x^3 + 3x^2 + 3x + 1$ is divided by $x + \pi$.

Q59. Use the Factor Theorem to determine whether $g(x)$ is a factor of $p(x)$ in the following case:

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

Q60. Determine the following polynomial has $(x + 1)$ a factor or not: $x^4 + 3x^3 + 3x^2 + x + 1$.

Q61. Determine the following polynomial has $(x + 1)$ a factor or not: $x^4 + x^3 + x^2 + x + 1$.

Q62. Determine the following polynomial has $(x + 1)$ a factor or not: $x^3 + x^2 + x + 1$.

Q63. Find the remainder when $x^3 + 3x^2 + 3x + 1$ is divided by $5 + 2x$.

Q64. Use the Factor Theorem to determine whether $g(x)$ is a factor of $p(x)$ in the following case:

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

Q65. Use the Factor Theorem to determine whether $g(x)$ is a factor of $p(x)$ in the following case:

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

Q66. Find the value of k, if $x - 1$ is a factor of $p(x)$ in the following case: $p(x) = x^2 + x + k$.

Q67. Find the value of k, if $x - 1$ is a factor of $p(x)$ in the following case: $p(x) = kx^2 - 3x + k$.

Q68. Factorise: $12x^2 - 7x + 1$.

Q69. Factorise: $2x^2 + 7x + 3$.

Q70. Factorise: $6x^2 + 5x - 6$.

Q71. Factorise: $3x^2 - x - 4$.

Q72. Use suitable identitie to find the following product:

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

Q73. Factorise the following using appropriate identitie: $4y^2 - 4y + 1$.

Q74. Factorise the following using appropriate identitie: $9x^2 + 6xy + y^2$.

Q75. Evaluate the following product without multiplying directly: 104×96.

Q76. Evaluate the following product without multiplying directly: 95×96.

Q77. Evaluate the following product without multiplying directly: 103×107.

Q78. Factorise the following using appropriate identitie:

$$x^2 - \frac{y^2}{100}.$$

Q79. Evaluate the following using suitable identitie: $(99)^3$.

Q80. Write the following cube in expanded form: $(2a - 3b)^3$.

Q81. Write the following cube in expanded form: $(2x + 1)^3$.

Q82. Factorise: $4x^2 + 9y^2 + 16z^2 + 12xy - 24yz - 16xz$.

Q83. Expand the following, using suitable identitie: $(-2x + 5y - 3z)^2$.

Q84. Expand the following, using suitable identitie: $(-2x + 5y - 3z)^2$.

Q85. Expand the following, using suitable identitie: $(-2x + 3y + 2z)^2$.

Q86. Expand the following, using suitable identitie: $(2x - y + z)^2$.

Q87. Expand the following, using suitable identitie: $(x + 2y + 4z)^2$.

Q88. Evaluate the following using suitable identitie: $(102)^3$.

Q89. Evaluate the following using suitable identitie: $(998)^3$.

Q90. Factorise the following: $8a^3 + b^3 + 12a^2b + 6ab^2$.

Q91. Factorise the following: $8a^3 - b^3 - 12a^2b + 6ab^2$.

Q92. Factorise the following: $27 - 125a^3 - 135a + 225a^2$.

Q93. Factorise the following: $64a^3 - 27b^3 - 144a^2b + 108ab^2$.

Q94. Verify : $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$.

Q95. Verify : $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$

Q96. Factorise the following: $27y^3 + 125z^3$.

Q97. Factorise the following: $64m^3 - 343n^3$.

Q98. Without actually calculating the cube, find the value of the following: $(-12)^3 + (7)^3 + (5)^3$.

Q99. Without actually calculating the cube, find the value of the following: $(28)^3 + (-15)^3 + (-13)^3$.

Q100. Find the degree of each of the polynomials given below:

(i) $x^5 - x^4 + 3$ (ii) $2 - y^2 - y^3 + 2y^8$ (iii) 2

Q101. Factories $8x^3 + y^3 + 27z^3 + 18xyz$

Q102. Factories $8x^3 + 27y^3 + 36x^2y + 54xy^2$

Q103. Find the following products using appropriate identities:

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

Q104. Factorise $x^3 - 23x^2 + 142x - 120$.

Q105. Factorise $6x^2 + 17x + 5$, splitting the middle term, and by using the Factor Theorem.

Q106. Find the value of k, if $x - 1$ is a factor of $4x^3 + 3x^2 - 4x + k$.

Q107. Examine whether $x + 2$ is a factor of $x^3 + 3x^2 + 5x + 6$ and of $2x + 4$.

Q108. Find the value of each of the following polynomials at the indicated value of variables:

(i) $p(x) = 5x^2 - 3x + 7$ at $x = 1$. (ii) $q(y) = 3y^4 - 4y + \sqrt{11}$ at $y = 2$. (iii) $p(t) = 4t^4 + 5t^3 - t^2 + 6$ at $t = a$.

Q109. Find the value of polynomial $5x - 4x^2 + 3$ at

(i) $x = 0$ (ii) $x = -1$ (iii) $x = 2$

Q110. Factorise: $27x^3 + y^3 + z^3 - 9xyz$.

Q111. Give possible expressions for the length and breadth of each of the following rectangles, in which their areas are given:

Area : $25a^2 - 35a + 12$	Area : $35y^2 + 13y - 12$
(i)	(ii)

Q112. Verify that $x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x + y + z)[(x - y)^2 + (y - z)^2 + (z - x)^2]$

Q113. What are the possible expressions for the dimensions of the cuboids whose volumes are given below?

Volume : $3x^2 - 12x$	Volume : $12ky^2 + 8ky - 20k$
(i)	(ii)

Q114 Find $p(0)$, $p(1)$ and $p(2)$ for the following polynomial: $p(y) = y^2 - y + 1$

Q115 Find $p(0)$, $p(1)$ and $p(2)$ for the following polynomial: $p(t) = 2 + t + 2t^2 - t^3$.

Q116 Find $p(0)$, $p(1)$ and $p(2)$ for the following polynomial: $p(x) = x^3$.

Q117 Find $p(0)$, $p(1)$ and $p(2)$ for the following polynomial: $p(x) = (x - 1)(x + 1)$.

Q118 Find the zero of the polynomial in each of the following cases:

(i) $p(x) = x + 5$ (ii) $p(x) = 3x - 2$ (iii) $p(x) = cx + d$, $c \neq 0$, c, d are real numbers.

Q119 Determine the following polynomial has $(x + 1)$ a factor or not: $x^3 - x^2 - (2 + \sqrt{2})x + \sqrt{2}$.

Q120 Factorise: $2y^3 + y^2 - 2y - 1$.

Q121 Factorise: $x^3 + 13x^2 + 32x + 20$.

Q122 Factorise: $x^3 - 3x^2 - 9x - 5$.

Q123 Factorise: $x^3 - 2x^2 - x + 2$.

Q124 Find the value of k, if $x - 1$ is a factor of $p(x)$ in the following case: $p(x) = 2x^2 + kx + \sqrt{2}$.

Q125 Expand the following, using suitable identitie:

$$\left[\frac{1}{4}a - \frac{1}{2}b + 1\right]^2.$$

Q126 Factorise: $2x^2 + y^2 + 8z^2 - 2\sqrt{2}xy + 4\sqrt{2}yz - 8xz$.

Q127 Write the following cube in expanded form:

$$\left[x - \frac{2}{3}y\right]^3.$$

Q128 Write the following cube in expanded form:

$$\left[\frac{3}{2}x + 1\right]^3.$$

Q129 Factorise the following:

$$27p^3 - \frac{1}{216} - \frac{9}{2}p^2 + \frac{1}{4}p.$$

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S1. $\frac{-1}{2}$.

S2. $27a^3 + 64b^3 + 108a^2b + 144ab^2$.

S3. $125p^3 - 27q^3 - 225p^2q + 135pq^2$.

S4. 1.

S5. -1.

S6. $\frac{\pi}{2}$.

S7. 0.

S8. 3.

S9. 2.

S10. 1.

S11. 0.

S12. Linear.

S13. No.

S14. Yes.

S15. Yes.

S16. No.

S17. 1.

S18. $9 - 4x^2$.

S19. $9x^2 - 3x - 20$.

S20. $x^2 + 14x + 40$.

S21. $x^2 - 2x - 80$.

S22. 2 and 0 both are zeros of polynomial $x^2 - 2x$.

S23. -2 is a zero of polynomial $(x + 2)$ but 2 is not.

S24. Quotient = $(3x - 2)$, Reminder = 1.

S25. Quotient = $3x^3 - x^2 - x - 4$, Reminder = (-5).

S26. 0.

S27. 2.

S28. Proved.

S29. $(y - 2)(y - 3)$.

S30. 11130.

S31. $9a^2 + 16b^2 + 25c^2 + 24ab + 40bc + 30ac$.

S32. $16a^2 + 4b^2 + 9c^2 - 16ab + 12bc - 24ac$.

S33. $(2x - y + z)(2x - y + z)$.

S34. $3x^{35} - 4$; $\sqrt{2}\,y^{100}$. (You can write some more polynomials with different coefficients.)

S35. $5a$.

S36. No, since remainder is not zero.

S37. prove.

S38. $(7a + 5b)(7a + 5b)$.

S39. $\left(\frac{5}{2}x + \frac{y}{3}\right)\left(\frac{5}{2}x - \frac{y}{3}\right)$.

S40. 1124864.

S41. 997002999.

S42. It is polynomials in one variable.

S43. It is polynomials in one variable.

S44. Is not polynomials, because in each of these exponent of the variable is not a whole number.

S45. Is not polynomials, because in each of these exponent of the variable is not a whole number.

S46. It is a polynomial in three variables.

S47. (i) Cubic (ii) Quadratic

S48. (i) Quadratic (ii) Linear

S49. (i) Quadratic (ii) Cubic

S50. Yes.

S51. Yes.

S52. Yes.

S53. $-\frac{1}{\sqrt{3}}$ is a zero, but $\frac{2}{\sqrt{3}}$ is not a zero of the polynomial.

S54. (i) 5 (ii) 0

S55. (i) $\frac{-5}{2}$ (ii) 0

S56. 0.

S57. $\frac{27}{8}$.

S58. $-\pi^3 + 3\pi^2 - 3\pi + 1$.

S59. Yes.

S60. No, $(x + 1)$ is not a factor.

S61. No, $(x + 1)$ is not a factor.

S62. Yes, $(x + 1)$ is a factor.

S63. $-\frac{27}{8}$.

S64. No.

S65. Yes.

S66. -2.

S67. $\frac{3}{2}$.

S68. $(3x - 1)(4x - 1)$.

S69. $(x + 3)(2x + 1)$.

S70. $(2x + 3)(3x - 2)$.

S71. $(x + 1)(3x - 4)$.

S72. $y^4 - \frac{9}{4}$.

S73. $(2y - 1)(2y - 1)$.

S74. $(3x + y)(3x + y)$.

S75. 9984.

S76. 9120.

S77. 11021.

S78. $\left(x + \frac{y}{10}\right)\left(x - \frac{y}{10}\right)$.

S79. 970299.

S80. $8a^3 - 27b^3 - 36a^2b + 54ab^2$.

S81. $8x^3 + 12x^2 + 6x + 1$.

S82. $(2x + 3y - 4z)(2x + 3y - 4z)$.

S83. $4x^2 + 25y^2 + 9z^2 - 20xy - 30yz + 12xz$.

S84. $9a^2 + 49b^2 + c^2 - 42ab + 14bc - 6ac$.

S85. $4x^2 + 9y^2 + 4z^2 - 12xy + 12yz - 8xz$.

S86. $4x^2 + y^2 + z^2 - 4xy - 2yz + 4xz$.

S87. $x^2 + 4y^2 + 16z^2 + 4xy + 16yz + 8xz$.

S88. 1061208.

S89. 994011992.

S90. $(2a + b)(2a + b)(2a + b)$.

S91. $(2a - b)(2a - b)(2a - b)$.

S92. $(3 - 5a)(3 - 5a)(3 - 5a)$.

S93. $(4a - 3b)(4a - 3b)(4a - 3b)$.

S94. Try yourself.

S95. Try yourself.

S96. $(3y + 5z)(9y^2 + 25z^2 - 15yz)$.

S97. $(4m - 7n)(16m^2 + 49n^2 + 28mn)$.

S98. -1260. Let $a = -12$, $b = 7$, $c = 5$. Here, $a + b + c = 0$.

S99. 16380.

S100.(i) 5 (ii) 8 (iii) 0

S101.$(2x + y + 3z)(4x^2 + y^2 + 9z^2 - 2xy - 3yz - 6xz)$.

S102.$(2x + 3y)(2x + 3y)(2x + 3y)$.

S103.(i) $x^2 + 6x + 9$ (ii) $x^2 + 2x - 15$

S104.$(x - 1)(x - 10)(x - 12)$.

S105.$(3x + 1)(2x + 5)$.

S106.$k = -3$.

S107. Yes, $x + 2$ is a factor of $x^3 + 3x^2 + 5x + 6$ and of $2x + 4$.

S108. (i) 9 (ii) $16 + \sqrt{11}$ (iii) $4a^4 + 5a^3 - a^2 + 6$

S109. (i) 3 (ii) -6 (iii) -3

S110. $(3x + y + z)(9x^2 + y^2 + z^2 - 3xy - yz - 3xz)$

S111. (i) One possible answer is : Length $= 5a - 3$, Breadth $= 5a - 4$.

(ii) One possible answer is : Length $= 7y - 3$, Breadth $= 5y + 4$.

S112. Simplify RHS.

S113. (i) One possible answer is : 3, x and $x - 4$. (ii) One possible answer is : $4k$, $3y + 5$ and $y - 1$.

S114. 1, 1, 3.

S115. 2, 4, 4.

S116. 0, 1, 8.

S117. -1, 0, 3.

S118. (i) -5 (ii) $\frac{2}{3}$ (iii) $-\frac{d}{c}$

S119. No, $(x + 1)$ is not a factor.

S120. $(y - 1)(y + 1)(2y + 1)$.

S121. $(x + 1)(x + 2)(x + 10)$.

S122. $(x + 1)(x + 1)(x - 5)$

S123. $(x - 1)(x - 2)(x + 1)$.

S124. $-(2 + \sqrt{2})$.

S125. $\frac{a^2}{16} + \frac{b^2}{4} + 1 - \frac{ab}{4} - b + \frac{a}{2}$.

S126. $(-\sqrt{2}\,x + y + 2\sqrt{2}\,z)(-\sqrt{2}\,x + y + 2\sqrt{2}\,z)$.

S127. $x^3 - \frac{8}{27}y^3 - 2x^2y + \frac{4xy^2}{3}$.

S128. $\frac{27}{8}x^3 + \frac{27}{4}x^2 + \frac{9}{2}x + 1$.

S129. $\left(3p - \frac{1}{6}\right)\left(3p - \frac{1}{6}\right)\left(3p - \frac{1}{6}\right)$.