Chapter 0 Algebraic Concepts 2

Sections 5-6

1. What is the degree of the polynomial below?
   $6x^2 - 3x^9 + 4$
   A) 6
   B) 3
   C) 9
   D) 2
   E) 4
   Ans: C

2. What is the coefficient of the highest-degree term in the polynomial below?
   $5x^2 - 8x^6 + 4$
   A) 5
   B) –8
   C) 2
   D) 6
   E) 4
   Ans: B

3. What is the the constant term in the polynomial below?
   $9x^6 - 4x^7 + 5$
   A) 6
   B) 9
   C) 5
   D) 7
   E) –4
   Ans: C

4. Determine whether the following expression is a polynomial of one variable.
   $7x^3 - 6x^7 + 3$
   A) yes
   B) no
   Ans: A

5. What is the degree of the polynomial below?
   $4x^5 + 8x^2y^7 - 6y^4$
   A) 5
   B) 4
   C) 7
   D) 2
   E) 9
   Ans: E

6. What is the coefficient of the highest-degree term in the polynomial below?
$5x^6 + 2x^2y^9 - 6y^7$
A) 5
B) 2
C) 6
D) 9
E) 7
Ans: B

7. What is the constant term in the polynomial below?
$9x^3 + 7x^2y^6 - 8y^3$
A) 0
B) 9
C) 7
D) 8
E) 6
Ans: A

8. Determine whether the following expression is a polynomial of one variable.
$2x^5 + 7x^2y^8 - 4y^4$
A) yes
B) no
Ans: B

9. A polynomial is an expression of form $a_n x^n + a_{n-1}x^{n-1} + \cdots + a_1 x + a_0$, where *n* is a positive integer.
For the polynomial $15x^4 - 13x - 2$ what is a_0?
A) 0
B) 2
C) 13
D) –2
E) 4
Ans: D

10. A polynomial is an expression of the form $a_n x^n + a_{n-1}x^{n-1} + \cdots + a_1 x + a_0$, where *n* is a positive integer.
For the polynomial $13x^3 - 6x - 14$ what is a_3?
A) 0
B) 13
C) 6
D) 14
E) 3
Ans: B

11. A polynomial is an expression of the form $a_n x^n + a_{n-1}x^{n-1} + \cdots + a_1 x + a_0$, where *n* is a positive integer.
For the polynomial $9x^4 - 6x - 2$ what is a_1?
A) 0
B) 9
C) –6
D) –2
E) 4
Ans: C

12. A polynomial is an expression of the form $a_n x^n + a_{n-1}x^{n-1} + \cdots + a_1 x + a_0$, where *n* is a positive integer.
For the polynomial $14x^3 - 13x - 5$ what is a_2?
A) 0
B) 14
C) –13
D) –5
E) 3
Ans: A

13. Evaluate the algebraic expression at the indicated values of the variables.
$3x^2 - 2y^2 - 2xy$ at $x = 3$ and $y = -3$
A) 9
B) –9
C) 27
D) 3
E) 21
Ans: C

14. Evaluate the algebraic expression at the indicated value of the variable.
$\frac{16y}{1-y}$ at $y = -7$
A) 14
B) $\frac{-2}{7}$
C) 2
D) –14
E) $\frac{-7}{2}$
Ans: D

15. Evaluate $R\left[\dfrac{0.083i}{1-(1+0.083i)^{-n}}\right]$ when $R=100000,\ i=0.07,\ n=280.$

A) 114.7388
B) 10,342.4865
C) 147,749.8073
D) 723.9741
E) 1639.1260
Ans: D

16. Simplify by combining like terms.
$(2x^4+4x^4y^3)+(2x^4y^3-5x^4)$

A) $-3x^4+9x^4y^3$
B) $-3x^4+6x^4y^3$
C) $2x^4+6x^4y^3$
D) $2x^4+7x^4y^3$
E) $-3x^4+2x^4y^3$
Ans: B

17. Simplify by combining like terms.
$(6m^2-3n^2+5)-(3m^2+8n^2+6)$

A) $9m^2-11n^2-11$
B) $9m^2-5n^2-1$
C) $3m^2-11n^2-11$
D) $3m^2-5n^2-6$
E) $3m^2-11n^2-1$
Ans: E

18. Simplify by combining like terms.
$(6rs-2r^2s-11rs^2)-(11rs^2-2rs+6r^2s)$

A) $8rs-8r^2s-22rs^2$
B) $8rs-4r^2s$
C) $4rs-4r^2s-22rs^2$
D) $8rs-8r^2s$
E) $8rs-4r^2s-22rs^2$
Ans: A

19. Simplify by combining like terms.
$x^3 + \left(4x - \left(x^3 - 4x\right)\right)$

A) 0
B) $2x^3 + 8x$
C) $2x^3$
D) $8x$
E) $2x^3 - 8x$
Ans: D

20. Simplify by combining like terms.
$y^2 - [y^3 - (y^2 + y^3)] - [y^2 + (1 - y^3)]$

A) $y^2 - 1$
B) $y^3 + y^2 - 1$
C) $2y^3 + y^2 - 1$
D) $y^3 + 2y^2 - 1$
E) $y^3 - 1$
Ans: B

21. Perform the indicated operations and simplify.
$\left(3x^4 y\right)\left(-3xy^2\right)\left(-3x^2 y^2\right)$

A) $27x^5 y^5$
B) $27x^5 y^7$
C) $-27x^5 y^7$
D) $-27x^4 y^7$
E) $27x^7 y^5$
Ans: E

22. Perform the indicated operations and simplify.
$\left(-10m^3 n\right) \div \left(2mn^5\right)$

A) $-5m^2 n^4$
B) $\dfrac{-5m^2}{n^4}$
C) $\dfrac{-5m^4}{n^2}$
D) $-5m^4 n^6$
E) $\dfrac{-5n^2}{m^4}$
Ans: B

23. Perform the indicated operations and simplify.

$ax^3\left(5x^2+ax+ab\right)$

A) $5ax^5+a^2x^4+a^2bx^3$

B) $a^2x^4+x^3\left(5a+ab\right)$

C) $5ax^3+a^2x^4+bx^3$

D) $5ax^5+5a^2x^4+5a^2bx^3$

E) $x^4\left(5a+a^2\right)+a^2bx^3$

Ans: A

24. Perform the indicated operations and simplify.

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

A) $12y^2+y-10$

B) $20y^2-23y-10$

C) $15y^2+2y-8$

D) $20y^2+23y-8$

E) $12y^2+y$

Ans: C

25. Perform the indicated operations and simplify.

$(2x-1)(x-6)$

A) $2x^2-12x+6$

B) $2x^2-13x-6$

C) $2x^2+12x-6$

D) $2x^2+13x+6$

E) $2x^2-13x+6$

Ans: E

26. Perform the indicated operations and simplify.

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

A) x^6+9x^3-9

B) $9x^6+27x^3-36$

C) $3x^6+9x^3-12$

D) x^6+9x^3-3

E) $3x^6+9x^3-9$

Ans: B

27. Perform the indicated operations and simplify.

$(4x+2)^2$

A) $16x^2+8x+8$
B) $16x^2+8x+4$
C) $16x^2+16x+16$
D) $16x^2+16x+8$
E) $16x^2+16x+4$

Ans: E

28. Perform the indicated operations and simplify.

$(3y+1)^2$

A) $9y^2+3y+1$
B) $9y^2+6y+3$
C) $9y^2+6y+1$
D) $9y^2+6y+3$
E) $9y^2+3y+1$

Ans: C

29. Perform the indicated operations and simplify.

$(x^3y^2-0.2)^2$

A) $x^6y^4-0.04x^3y^2+0.4$
B) $x^6y^4-0.4x^3y^2+0.04$
C) $x^6y^4+0.4x^3y^2+0.04$
D) $x^5y^4-0.4x^3y^2+0.04$
E) $x^5y^4+0.04x^3y^2+0.4$

Ans: B

30. Perform the indicated operations and simplify.

$2(4y+3)(4y-3)$

A) $32y^2-24-18$
B) $32y^2-9$
C) $16y^2-12$
D) $16y^2+24-18$
E) $32y^2-18$

Ans: E

31. Perform the indicated operations and simplify.
$\left(\frac{1}{3}+x\right)\left(\frac{1}{3}-x\right)$

A) $\frac{1}{9}+\frac{2}{3}x-x^2$

B) $\frac{1}{9}-x^2$

C) $\frac{1}{9}-\frac{2}{3}x-x^2$

D) $\frac{2}{9}-x^2$

E) $\frac{2}{3}-x^2$

Ans: B

32. Perform the indicated operations and simplify.
$(5.1x+2.6)(5.1x-2.6)$

A) $26.01x^2-6.76$

B) $6.76x^2-26.52x-26.01$

C) $26.01x^2-26.52x-6.76$

D) $26.01x^2+6.76$

E) $6.76x^2-26.01$

Ans: A

33. Perform the indicated operations and simplify.
$(x-4)(x^2+4x+3)$

A) $x^3+8x^2+19x+12$

B) x^3+4x^2-12

C) $x^3-13x-12$

D) $x^3+4x^2-13x-12$

E) x^3+8x^2+12

Ans: C

34. Perform the indicated operations and simplify.
$\left(a+d\right)\left(a^2-ad+d^2\right)$

A) a^3+d^3

B) $a^3+d^3+2ad^2-ad$

C) a^3-2a^2d+2ad

D) $a^3+ad^2+a^2d-2ad$

E) $a^3-2ad^2+2ad+d$

Ans: A

35. Perform the indicated operations and simplify.
$(x^3-1)(x^7-3x^3-5x^2+5)$

A) $x^{10}-x^7+3x^6+5x^5+8x^3+5x^2-5$
B) $x^{10}-x^7-5x^5+8x^3+5x^2-5$
C) $x^{10}-x^7+5x^6+3x^5+8x^3+3x^2-5$
D) $x^{10}-x^7-3x^6-5x^5+8x^3+5x^2-5$
E) $x^{10}-x^7-3x^5+8x^3-3x^2-5$

Ans: D

36. Perform the indicated operations and simplify.
$(2x-3)(3x+2)-(5x-2)(x-3)$

A) $5x^2+12x-6$
B) $x^2+8x-12$
C) x^2+8x-6
D) $x^2+12x-12$
E) $5x^2+12x-12$

Ans: D

37. Perform the indicated operations and simplify.
$(6x^4+2xy^2+10x)\div(2xy)$

A) $3x^3+y+\dfrac{5x}{y}$
B) $\dfrac{3x^3}{y}+y+\dfrac{5}{y}$
C) $3x^3+y+\dfrac{5}{y}$
D) $\dfrac{3x^3}{y}+\dfrac{5}{y}$
E) $\dfrac{3x^3}{y}+2y+\dfrac{5}{y}$

Ans: B

38. Perform the indicated operations and simplify.
$\left(6x^2y^2 - 18xy + 15xy^2\right) \div \left(3xy\right)$

A) $2xy - 6 + 5y$

B) $\dfrac{2xy^2}{3} - 6x + 15y$

C) $\dfrac{2x^2y}{3} - 6 + \dfrac{5xy}{3}$

D) $\dfrac{2xy}{3} - 6y + \dfrac{5y^2}{3}$

E) $\dfrac{2xy}{3} - 6 + 5y$

Ans: A

39. Perform the indicated operations and simplify.
$\left(x - 5\right)^3$

A) $x^3 + 15x^2 + 75x + 125$

B) $x^3 + 75x - 125$

C) $x^3 - 15x^2 + 75x - 125$

D) $x^3 - 125$

E) $x^3 + 10x^2 + 50x - 125$

Ans: C

40. Perform the indicated operations and simplify.
$(5x + 2)^3$

A) $125x^3 + 30x^2 + 30x + 8$

B) $125x^3 + 150x^2 + 60x + 8$

C) $125x^3 + 30x^2 + 60x + 125$

D) $125x^3 + 50x^2 + 60x + 8$

E) $125x^3 + 24x^2 + 375x + 8$

Ans: B

41. Perform the indicated operations and simplify.
$(x^5 + 2x - 6) \div (x + 1)$

A) $x^4 - 2x^3 + x^2 - 6x + 3 - \dfrac{9}{x+1}$

B) $x^4 - x^3 + 3 - \dfrac{9}{x+1}$

C) $x^4 + x^3 + x^2 + x + 2 + \dfrac{9}{x+1}$

D) $x^4 - x^3 + x^2 - x + 3 - \dfrac{9}{x+1}$

E) $x^4 - 2x^3 + 6x + 3 - \dfrac{9}{x+1}$

Ans: D

42. Perform the indicated operations and simplify.
$(x^3 + 3x^2 - 2) \div (x^2 - 2)$

A) $x + 3 - \dfrac{2x-4}{x^2-2}$

B) $x + 3 + \dfrac{2x+6}{x^2-2}$

C) $x + 3 - \dfrac{2x+4}{x^2-2}$

D) $x + 3 + \dfrac{2x+4}{x^2-2}$

E) $x + 3 - \dfrac{2x-8}{x^2-2}$

Ans: D

43. Perform the indicated operations with expressions involving fractional exponents and then simplify.
$x^{1/2}\left(x^{1/2} + 6x^{5/2}\right)$

A) $x^{1/4} + 6x^{5/4}$

B) $x + 6x^5$

C) $x + 6x^3$

D) $x^{1/2} + 6x^3$

E) $x^{1/4} + 6x^5$

Ans: C

44. Perform the indicated operations with expressions involving fractional exponents and then simplify.
$x^{-1/3}\left(x^{4/3}-x^{-2/3}\right)$

A) $x-\dfrac{1}{x}$

B) $\dfrac{1}{x^2}$

C) $1-\dfrac{1}{x}$

D) $x-1$

E) $x+\dfrac{1}{x}$

Ans: A

45. Perform the indicated operations with expressions involving fractional exponents and then simplify.
$\left(x^{1/3}-x^{1/2}\right)\left(2x^{2/3}-5x^{3/2}\right)$

A) $5x-2x^{11/6}-5x^{7/6}+2x^2$

B) $2x-5x^{11/6}-2x+5x^2$

C) $5x-2x^{7/6}+5x^2$

D) $2x-5x^{11/6}-2x^{7/6}+5x^2$

E) $5x-2x^2-5x^{7/6}+2x^2$

Ans: D

46. Perform the indicated operations with expressions involving radicals and then simplify.
$\left(\sqrt{x}+3\right)\left(\sqrt{x}-3\right)$

A) $x-9$

B) $x-3\sqrt{x}+9$

C) $x+3\sqrt{x}-9$

D) x

E) $x+9$

Ans: A

47. Perform the indicated operations with expressions involving fractional exponents and then simplify.
$\left(x^{1/4}+x^{1/2}\right)\left(x^{1/4}-x^{1/2}\right)$

A) x

B) $x^{1/2}-x$

C) $x^{1/4}-x$

D) $x^{1/2}$

E) $x^{1/4}-x^{1/2}$

Ans: B

48. Perform the indicated operations with expressions involving fractional exponents and then simplify.

$(3x-4)^{-5/3}\left[(3x-4)^{8/3}+4(3x-4)^{5/3}\right]$

A) $(3x-4)^{-5/3}$

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

C) $3x$

D) $(3x-4)^{5/3}$

E) $3x+4$

Ans: C

49. Suppose a company's revenue R (in dollars) from the sale of x units of its product is given by $R=190x$. Suppose further that the total costs C (in dollars) of producing those x units is given by $C=70x+10000$. If profit is revenue minus cost, find the expression for the profit from the production and sale of x units.

A) $70x-10000$

B) $120x-10000$

C) $260x+10000$

D) $190x+10000$

E) $260x-10000$

Ans: B

50. Cell Pro makes cell phones and has total weekly costs of $2000 for rent, utilities, and equipment, in addition to labor and material costs of $17.5 for each phone it makes.

If x represents the number of phones produced and sold, choose the expression for Cell Pro's weekly costs.

A) $C=2000-17.5x$

B) $C=17.5x$

C) $C=2000+17.5x$

D) $C=2000$

E) $C=17.5+2000x$

Ans: C

51. Cell Pro makes cell phones and has total weekly costs of $1500 for rent, utilities, and equipment, in addition to labor and material costs of $15.25 for each phone it makes.

Assume that Cell Pro sells the phones to dealers for $40.50 each. Choose the expression for the weekly total revenue for the phones, where x is the number of phones made and sold each week.

A) $R=15.25x$

B) $R=40.50x$

C) $R=40.50-15.25x$

D) $R=15.25-40.50x$

E) $R=40.50+15.25x$

Ans: B

52. Cell Pro makes cell phones and has total weekly costs of $1500 for rent, utilities, and equipment, in addition to labor and material costs of $16.25 for each phone it makes.

    Cell Pro's weekly profit is the total revenue minus the total cost. Choose the expression for Cell Pro's weekly profit if each phone sells for $43.50, where x is the number of phones made and sold each week.

    A) $P = 27.25x - 1500$
    B) $P = 43.50x - 1516.25$
    C) $P = 16.25x - 1500$
    D) $P = 27.25x - 16.25$
    E) $P = 43.50x - 1500$

    Ans: A

53. Suppose that you have $9000 to invest, and you invest x dollars at 10% and the remainder at 8%. Choose the expression that represents the amount invested at 8%.

    A) $9000 + 0.1x$
    B) $9000 - x$
    C) $9000 + x$
    D) $9000 - 0.1x$
    E) $9000 + 0.08x$

    Ans: B

54. Suppose that you have $7000 to invest, and you invest x dollars at 10% and the remainder at 8%. Choose the expression that represents the interest earned on the money invested at 8%.

    A) $0.1(7000 - x)$
    B) $0.1x$
    C) $0.08(7000 - x) - 0.1x$
    D) $0.08(7000 - x)$
    E) $0.1(7000 - x) - 0.08x$

    Ans: D

55. Suppose that a nurse needs 15 cc (cubic centimeters) of a 15.5% solution (that is, a solution that is 15.5% ingredient) of a certain medication, which must be obtained by mixing x cc of a 20% solution and y cc of a 5% solution. Choose the expression for y in terms of x.

    A) $y = 15 - 0.2x$
    B) $y = 15 - x$
    C) $y = 0.2x + 15$
    D) $y = x + 15$
    E) $y = 15 - 0.05x$

    Ans: B

56. Suppose that a nurse needs 15 cc (cubic centimeters) of a 15.5% solution (that is, a solution that is 15.5% ingredient) of a certain medication, which must be obtained by mixing x cc of a 20% solution and y cc of a 5% solution. Choose the expression for the amount of ingredient in the 5% solution.

A) $0.05(15+x)$

B) $0.215-x$

C) $0.05(15-x)$

D) $0.155(15-x)$

E) $0.2(15-x)$

Ans: C

57. Suppose that a nurse needs 15 cc (cubic centimeters) of a 15.5% solution (that is, a solution that is 15.5% ingredient) of a certain medication, which must be obtained by mixing x cc of a 20% solution and y cc of a 5% solution. Express the total amount of the ingredient in the mixture in terms of x.

A) $0.75+0.2x$

B) $3+0.15x$

C) $0.75+0.1x$

D) $0.75+0.15x$

E) $3+0.2x$

Ans: D

58. Factor by finding the common monomial factor.

$6a^2b-40x+2bx^2$

A) $2\left(3a^2b-40x+2bx^2\right)$

B) $2\left(3a^2b-20x+bx^2\right)$

C) $3\left(2a^2b-20x+bx^2\right)$

D) $3\left(3a^2b-20x+2bx^2\right)$

E) $2\left(2a^2b-40x+bx^2\right)$

Ans: B

59. Factor by finding the common monomial factor.

$15x^5+35xy^3+10xy^4$

A) $5x\left(3x^4+7y^3+2y^4\right)$

B) $5x\left(3x^5+7y^2+2xy^4\right)$

C) $5\left(3x^5+7xy^3+2xy^4\right)$

D) $5xy\left(3x^4+7y^2+2y^3\right)$

E) $5x\left(3+7y^3+2y^4\right)$

Ans: A

60. Factor by finding the common monomial factor.

$6y^5z + 2yz^3 - 4y^5z^3$

A) $2yz\left(3y^5 + z^3 - 2y^4z^2\right)$

B) $2z\left(3y^5 + z^2 - 2y^5z^2\right)$

C) $2y\left(3y^4 + z^3 - 2y^4z^3\right)$

D) $2yz\left(3y^4 + z^2 - 2y^4z^2\right)$

E) $2yz\left(3y^4 + yz^2 - 2y^5z^3\right)$

Ans: D

61. Factor by grouping.

$7x^3 - 21x^2 + 2x - 6$

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

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

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

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

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

Ans: D

62. Factor by grouping.

$3y - 15 - x^2y + 5x^2$

A) $\left(3-x^2\right)\left(y+5\right)$

B) $\left(5-x^2\right)\left(y-3\right)$

C) $\left(5-x^2\right)\left(y+3\right)$

D) $\left(5+x^2\right)\left(y-3\right)$

E) $\left(3-x^2\right)\left(y-5\right)$

Ans: E

63. Factor by grouping.

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

A) $\left(x-2\right)\left(x^2-1\right)$

B) $\left(x-1\right)\left(x^2-2\right)$

C) $\left(x-1\right)\left(x^2+2\right)$

D) $\left(x-2\right)\left(x^2+1\right)$

E) $\left(x+1\right)\left(x^2-2\right)$

Ans: B

64. Factor the expression as a product of binomials.

$x^2 + 8x + 15$

A) $(x+5)^2$

B) $(x+3)(x+8)$

C) $(x+3)^2$

D) $(x+3)(x+5)$

E) $(x+8)(x+5)$

Ans: D

65. Factor the expression as a product of binomials.

$x^2 - 2x - 8$

A) $(x-2)(x-4)$

B) $(x-4)(x+1)$

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

D) $(x-4)(x+2)$

E) $(x+4)(x-2)$

Ans: D

66. Factor the expression as a product of binomials.

$20x^2 + 13x + 2$

A) $(x+4)(5x+2)$

B) $(8x+1)(5x+1)$

C) $(4x+1)(5x+2)$

D) $(4x+1)(5x+4)$

E) $(4x+1)(5x-2)$

Ans: C

67. Factor the expression as a product of binomials.

$x^2 - 10x + 25$

A) $(x-5)^2$

B) $(x+5)^2$

C) $(x-5)(x+5)$

D) $(x-10)(x+25)$

E) $(x-5)(x+10)$

Ans: A

68. Factor the expression as a product of binomials.

$25x^2 + 30x + 9$

A) $(5x-3)^2$

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

C) $(5x+3)^2$

D) $(5x+3)(3x+5)$

E) $(3x+5)^2$

Ans: C

69. Factor the expression as a product of binomials.

$144a^2 - 25b^2$

A) $(12a+5b)(12a-5b)$

B) $(12a-5b)^2$

C) $(5a-12b)(12a-5b)$

D) $(12a+5b)^2$

E) $(12a+5b)(5a-12b)$

Ans: A

70. Factor the expression as a product of binomials.

$49x^2 - 16y^2$

A) $(7x-4y)^2$

B) $(7x-4y)(4x+7y)$

C) $(7x+4y)^2$

D) $(4x-7y)(7x+4y)$

E) $(7x-4y)(7x+4y)$

Ans: E

71. Factor the expression as a product of binomials.

$10x^2 + 23x - 21$

A) $(10x+3)(x-7)$

B) $(x+3)(10x-7)$

C) $(x-3)(10x+7)$

D) $(x+7)(10x-3)$

E) $(10x-7)(x-3)$

Ans: B

72. Factor the expression as a product of binomials.

$10x^2 + 93x + 27$

A) $(x+3)(10x+9)$

B) $(x+9)(10x-3)$

C) $(10x+27)(x+9)$

D) $(x+9)(10x+3)$

E) $(10x+3)(x+27)$

Ans: D

73. Factor the expression completely.

$2x^7 + 8x^3$

A) $2x^4(x^3+4)$

B) $x^3(2x^4+8)$

C) $(2x^3-4)(x^4+4)$

D) $2x^3(x^4+4)$

E) $4x^3(x^4+2)$

Ans: D

74. Factor the expression completely.

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

A) $(x^2-5)(x-2)$

B) $(x^2-2)(x-5)$

C) $(x^2-5)(x+2)$

D) $(x^2+5)(x+2)$

E) $(x^2+5)(x-2)$

Ans: A

75. Factor the expression as a product of binomials.

$x^2 - x - 6$

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

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

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

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

E) $(x-2)(x+2)$

Ans: B

76. Factor the expression completely.

$3x^2 - 21x + 30$

A) $5(x-2)(x-3)$

B) $(x-2)(3x-5)$

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

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

E) $3(x-2)(x-5)$

Ans: E

77. Factor the expression completely.

$2x^3 - 12x^2 + 18x$

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

B) $2x(x-3)^2$

C) $3x(x-2)^2$

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

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

Ans: B

78. Factor the expression completely.

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

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

B) $x(x-3)^2$

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

D) $x(x+3)(x-3)$

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

Ans: C

79. Factor the expression completely.

$2x^2 + 11x + 5$

A) $(x+5)(2x+1)$

B) $(x+2)(5x+1)$

C) $(2x+5)(x+1)$

D) $(x-5)(2x-1)$

E) $(2x-5)(2x-1)$

Ans: A

80. Factor the expression completely.

$3x^2 - 6x - 45$

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

B) $3(x-5)(x-3)$

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

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

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

Ans: D

81. Factor the expression completely.

$4z^2 - 25w^2$

A) $(2z-5w)^2$

B) $(2z-5w)(2z+5w)$

C) $(5z-2w)^2$

D) $(2z-5w)(5z+2w)$

E) $(5z-2w)(5z+2w)$

Ans: B

82. Factor the expression completely.

$6x^2 + 55x - 19$

A) $(3x-1)(2x-19)$

B) $(3x-19)(2x+1)$

C) $(2x-1)(3x+19)$

D) $(3x-1)(2x+19)$

E) $(3x-1)(19x+2)$

Ans: D

83. Factor the expression completely.

$28x^2 + 33x - 28$

A) $(4x+7)(7x-4)$

B) $(7x-4)^2$

C) $(4x+7)(4x-7)$

D) $(4x-7)^2$

E) $(4x+7)(7x+4)$

Ans: A

84. Factor the expression completely.

$x^8 - 81$

A) $\left(x^4 - 9\right)\left(x^2 + 3\right)^2$

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

C) $\left(x^4 + 9\right)\left(x^2 + 3\right)\left(x^2 - 3\right)$

D) $\left(x^4 - 9\right)\left(x^2 + 3\right)\left(x^2 - 3\right)$

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

Ans: C

85. Factor the expression completely.

$81 - 18x^2 + x^4$

A) $\left(x - 3\right)^3 \left(x + 3\right)$

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

C) $\left(x - 3\right)^4$

D) $\left(x^2 + 9\right)^2$

E) $\left(x - 3\right)\left(x + 3\right)\left(x^2 + 9\right)$

Ans: B

86. Factor the expression completely.

$x^4 - 8x^2 - 9$

A) $\left(x^2 + 1\right)\left(x + 1\right)\left(x - 9\right)$

B) $\left(x^2 + 1\right)\left(x^2 - 9\right)$

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

D) $\left(x^2 + 1\right)\left(x + 6\right)\left(x - 3\right)$

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

Ans: E

87. Determine the missing factor.

$4x^{1/8} + 16x^{7/8} = 4x^{1/8}\left(?\right)$

A) $4 + 4x^{3/4}$

B) $1 + 4x^{1/8}$

C) $1 + 4x^{3/4}$

D) $4 + x^{1/8}$

E) $4 + x^{3/4}$

Ans: C

88. Determine the missing factor.

$x^{-1} - x^5 = x^{-1}(?)$

A) $x^{-1} - x^4$
B) $1 - x^6$
C) $1 - x^4$
D) $x^6 - 1$
E) $x^{-1} - x^6$

Ans: B

89. Determine the missing factor.

$5x(5x+1)^{-1/3} - (5x+1)^{2/3} = (5x+1)^{-1/3}(?)$

A) -1
B) $(5x+1)^{1/3}$
C) $5x$
D) $5x - 1$
E) $(5x+1)^{-1/3}$

Ans: A

90. Use the following factorization formulas involving cubes to factor the polynomial below.

Factorizations with Cubes

Perfect cube

$$a^3 + 3a^2b + 3ab^2 + b^3 = (a+b)^3$$

Perfect cube

$$a^3 - 3a^2b + 3ab^2 - b^3 = (a-b)^3$$

Difference of two cubes

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

Sum of two cubes

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

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

A) $(x+3)^3$
B) $(x-3)^3$
C) $(3-x)^3$
D) $x^3 - 3^3$
E) $x^3 + 3^3$

Ans: A

91. Use the following factorization formulas involving cubes to factor the polynomial below.

Factorizations with Cubes

Perfect cube

$$a^3 + 3a^2b + 3ab^2 + b^3 = (a+b)^3$$

Perfect cube

$$a^3 - 3a^2b + 3ab^2 - b^3 = (a-b)^3$$

Difference of two cubes

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

Sum of two cubes

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

$y^3 - 9y^2 + 81y - 27$

A) $(y+9)^3$

B) $(y-3)^3$

C) $(9-y)^3$

D) $(3-y)^3$

E) $y^3 + 3^3$

Ans: B

92. Use the following factorization formulas involving cubes to factor the polynomial below.

Factorizations with Cubes

Perfect cube

$$a^3 + 3a^2b + 3ab^2 + b^3 = (a+b)^3$$

Perfect cube

$$a^3 - 3a^2b + 3ab^2 - b^3 = (a-b)^3$$

Difference of two cubes

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

Sum of two cubes

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

$64x^3 - 1$

A) $(x+4)(16x^2 - x + 4)$

B) $(4x+1)(16x^2 - 4x + 1)$

C) $(4x-1)(16x^2 + 4x + 1)$

D) $(1-4x)(16x^2 + 4x + 1)$

E) $(x-4)(16x^2 + x + 4)$

Ans: C

93. Use the following factorization formulas involving cubes to factor the polynomial below.

Factorizations with Cubes

Perfect cube

$$a^3 + 3a^2b + 3ab^2 + b^3 = (a+b)^3$$

Perfect cube

$$a^3 - 3a^2b + 3ab^2 - b^3 = (a-b)^3$$

Difference of two cubes

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

Sum of two cubes

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

$a^3 + 125$

A) $(a+5)(a^2+5a+25)$

B) $(a-5)(a^2+5a+25)$

C) $(a+5)(a^2-5a-25)$

D) $(a+5)(a^2-5a+25)$

E) $(5-a)(a^2+5a+25)$

Ans: D

94. The future value of a simple-interest investment of Q dollars at an annual interest rate r for s years is given by the expression $Q + Qrs$. Factor this expression.

A) $Q(1+rs)$

B) $Qr(1+s)$

C) $(Q+r)(1+s)$

D) $(Q+1)(1+rs)$

E) $(Q+s)(1+r)$

Ans: A

95. When medicine is administered, the reaction (measured in change of blood pressure or temperature) can be modeled by (that is, described by) $R = \frac{cm^2}{2} - \frac{m^3}{7}$, where c is a positive constant and m is the amount of medicine absorbed into the blood. Factor the expression for the reaction.

A) $R = m\left(\frac{c}{2} - \frac{m}{7}\right)\left(1 - \frac{m}{7}\right)$

B) $R = m\left(\frac{c}{2} - \frac{m^2}{7}\right)\left(1 - \frac{c}{7}\right)$

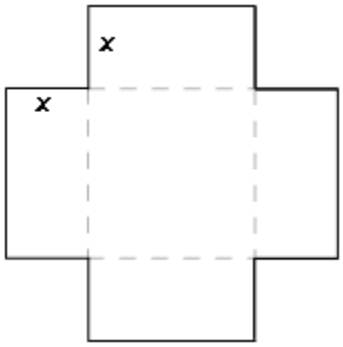
C) $R = m^3\left(\frac{c}{2} - \frac{1}{7}\right)$

D) $R = m^2\left(\frac{c}{2} - \frac{m}{7}\right)$

E) $R = \frac{cm^2}{2} - \frac{m^3}{7}$

Ans: D

96. Suppose that squares of size x are cut from four corners of an 6-by-6-inch piece of cardboard and an open-top box is formed. The volume of the box is given by $36x - 24x^2 + 4x^3$. Factor this expression.



A) $x(6+x)(6-x)$

B) $4x(3+x)(3-x)$

C) $4x(3+x)^2$

D) $4x(3-x)^2$

E) $x(6-x)^2$

Ans: D

97. The consumer expenditure *C* for a commodity is the product of its market price *p* and the number of units demanded *n*. Suppose that for a certain commodity, the consumer expenditure is given by $C = 2500p - 50p^3$. Factor this in order to find an expression for the number of units demanded *n*.

A) $n = 50p$

B) $n = 2500 - 50p^2$

C) $n = 50 - p^2$

D) $n = (p + 50)(50 - p^2)$

E) $n = 2500p - 50p^3$

Ans: B

98. Factor the following expression for the maximum power in a certain electrical circuit.

$$(R + r)^2 - 6r(R + r)$$

A) $(R + 6r)(1 - r)$

B) $(R + 6r)(R - r)$

C) $(R + r)(1 - 6r)$

D) $(R + r)(R - 5r)$

E) $(R + 5r)(R - 1)$

Ans: D

99. The expression for the speed of blood through an artery of radius *r* at a distance *c* from the artery wall is given by $r^2 - (r - c)^2$. Factor and simplify this expression.

A) c^2

B) $2c(c - r)$

C) $c(c - 2r)$

D) $(r - c)(r + c)$

E) $c(2r - c)$

Ans: E

