

2. Algebraic Simplification

1. The expanded form of $(a + 5)(2a - 3)$ is

- A. $2a^2 - 7a + 2$ B. $2a^2 + 2a - 15$ C. $2a^2 + 7a - 15$ D. $2a^2 - 2a + 15$

Ans: C

2. The expanded form of $(3a + 5)^2$ is

- A. $3a^2 + 15a + 25$ B. $9a^2 + 25$ C. $9a^2 + 15a + 25$ D. $9a^2 + 30a + 25$

Ans: D

3. The expanded form of $(4p - 3)^2$ is

- A. $16p^2 - 24p + 9$ B. $16p^2 + 9$ C. $16p^2 - 9$ D. $16p^2 + 12p + 9$

Ans: A

4. The expanded form of $(4m - 7)(4m + 7)$ is

- A. $16m^2 - 56m + 49$ B. $16m^2 + 56m - 49$ C. $16m^2 - 49$ D. $16m^2 + 49$

Ans: C

5. The expression $x^2 + mx + 25$ is the expansion of a perfect square if m has the value

- A. 5 B. 10 C. 2 D. -5

Ans: B

6. The expression $4y^2 - ay + 49$ is the expansion of a perfect square if a has the value

- A. 28 B. 14 C. 4 D. 7

Ans: A

7. The expansion of $m^2 + pm + 9n^2$ is the expansion of a perfect square if p represents

- A. 3 B. 6 C. $3n$ D. $6n$

Ans: D

8. The expression $(a + 2)(a - 2)(a + 1)$ is equivalent to

- A. $a^3 + a^2 - 4a - 4$ B. $a^3 - 4a^2 + 4a - 4$ C. $a^3 + 2a + 4a + 4$
D. $a^3 + 4a - 4$

Ans: A

9. The expression $(3a + 1)(1 - 3a)(1 - a)$ is equivalent to

- A. $-9a^3 + 15a^2 - 5a - 1$ B. $9a^2 - 1 - 9a^3 + a$ C. $1 - 9a^2 - a + 9a^3$
D. $9a^3 + 3a^2 - 7a - 1$

Ans: C

10. $\frac{3}{(2x-5)(x-3)} + \frac{2}{(x-3)(x-1)}$ simplifies to

- A. $\frac{5x-15}{x-3}$ B. $\frac{7x-13}{(2x-5)(x-3)(x-1)}$
C. $\frac{5}{(2x-5)(x-3)(x-3)}$ D. $\frac{5x-11}{(2x-5)(x-3)^2(x-1)}$

Ans: B

11. $\frac{4}{(3x-2)(x+5)} + \frac{2}{(5+x)(x+7)}$ simplifies to

- A. $\frac{10x+24}{(3x-2)(x+5)(x+7)}$ B. $\frac{6}{x+5}$
C. $\frac{6}{(3x-2)(x+5)(x+7)}$ D. $\frac{6x+30}{(3x-2)(x+5)^2(x+7)}$

Ans: A

12. $\frac{3}{2+x} - \frac{4}{(x+2)(x+3)}$ simplifies to

A. $\frac{-1}{(2+x)(x+2)(x+3)}$

B. $\frac{3x-5}{(x+2)^2(x+3)}$

C. $\frac{-1}{(x+2)}$

D. $\frac{3x-5}{(x+2)(x+3)}$

Ans: D

13. $\frac{5}{(3y+7)(y+1)} - \frac{2}{(y+1)(y+8)}$ simplifies to

A. $\frac{26-y}{(3y+7)(y+1)(y+8)}$

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

C. $\frac{3}{(3y+7)(y+1)^2(y+8)}$

D. $\frac{3y+3}{(3y+7)(y+1)(y+8)}$

Ans: A

14. Simplify $4m^2n - 3mn + 2m^2n - 6mn$

Ans: $6m^2n - 9mn$

15. Simplify $3p^2 + 5pq - 3qp - 11p^2$

Ans: $-8p^2 + 2pq$

16. Simplify $32 - 5m - 8m - 15$

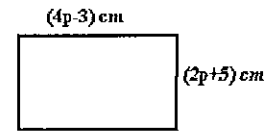
Ans: $17 - 13m$

17. Write down the simplest expression for:

$$3 + 7ht - 4t + 2th - 3t^2 - 1$$

Ans: $2 + 9ht - 4t - 3t^2$

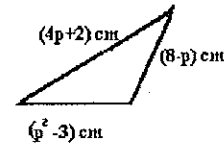
18.



- (a) Write an expression for the perimeter of the rectangle.
 (b) Find the value of the perimeter if p has the value of 3.

Ans: (a) $(12p + 4)$ cm; (b) 40 cm

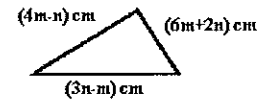
19.



- (a) Write an expression for the perimeter of the triangle.
 (b) What is the value of the perimeter if p has the value of 2.

Ans: (a) $(p^2 + 3p + 7)$ cm; (b) 17cm

20.



- (a) Write an expression for the perimeter of the triangle.
 (b) What is the value of the perimeter if $n = 1$ and $m = 2$.

Ans: (a) $(9m + 4n)$ cm; (b) 22cm

21. Expand $3(2a + 7b - 5c)$

Ans: $6a + 21b - 15c$

22. Expand $2a(3a + 5b - 1)$

Ans: $6a^2 + 10ab - 2a$

23. Expand $8(p^2 - 3p - 2q)$

Ans: $8p^2 - 24p - 16q$

24. Expand $4m(2 - 3m - 6n)$

Ans: $8m - 12m^2 - 24mn$

25. Expand $-8(5g - 2h)$

Ans: $40g + 16h$

26. Expand $-9(p^2 - 7pq + 3q^2)$

Ans: $-9p^2 + 63pq - 27q^2$

27. Write down the expanded form of the expression : $-6(2m - 3n + 6h)$

Ans: $-12m + 18n - 36h$

28. Write down the expanded form of the expression: $-a(2 + 3g)$

Ans: $-2a - 13ag$

29. Write down the expanded form of the expression: $-y(y - 4x + 3)$

Ans: $-y^2 + 4xy - 3y$

30. Expand and simplify: $5(2x + 3) + 7(4 + 5x)$

Ans: $45x + 43$

31. Expand and simplify: $7(3y - 4) + 2(2 - y)$

Ans: $19y - 24$

32. What is the simplest form of: $8(3m - 2n) - 2(4m - n)$

Ans: $16m - 14n$

33. What is the simplest form of: $2(y^2 - 5y + 7) - 3(y^2 + 2y - 1)$

Ans: $-y^2 - 16y + 17$

34. What is the simplest form of: $h(3h - 4t + 7) - 4(h^2 - 3t + 1)$

Ans: $-h^2 - 4ht + 7h + 12t - 4$

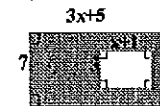
35. Write in its simplest form: $m(m - 2n + 1) - (m^2 + mn + m)$

Ans: mn

36. Write an expression for the area of a rectangle whose length is 5cm more than its width.

Ans: $w(w + 5)$

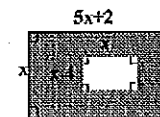
37.



Find, in its simplest form, an expression for the area of the shaded region.

Ans: $18x = 32$

38.



Find, in its simplest form, an expression for the area of the shaded region.

Ans: $6x^2 - 2x$

39. Expand and simplify: $(y + 2)(y + 5)$

Ans: $y^2 + 7y + 10$

40. Expand and simplify: $(h + 8t)(h + 4t)$

Ans: $h^2 + 12ht + 32t^2$

41. Expand and simplify: $(3h + 2)(5h + 7)$

Ans: $15h^2 + 31h + 14$

42. Expand and simplify: $(7a + 1)(2 + 3a)$

Ans: $21a^2 + 17a + 2$

43. Expand and simplify: $(2a + 3)^2$

Ans: $4a^2 + 12a + 9$

44. Expand and simplify: $(2p + 5h)^2$

Ans: $4p^2 + 20hp + 25h^2$

45. Expand and simplify: $(4m - 3)^2$

Ans: $16m^2 - 24m + 9$

46. Expand and simplify: $(2x - 7y)^2$

Ans: $4x^2 - 28xy + 49y^2$

47. What is the expansion of: $(2a - 1)(2a + 1)$

Ans: $4a^2 - 1$

48. Write down the expanded form of: $(4 - 7a)(4 + 7a)$

Ans: $16 - 49a^2$

49. Find the simplest expression equivalent to: $(a + 3)(a + 1) + (2a + 1)(3 + a)$

Ans: $3a^2 + 11a + 6$

50. Find the simplest expression equivalent to: $(7m + 3)(m - 2) + (2m - 1)(m - 3)$

Ans: $9m^2 - 18m - 3$

51. Simplify $(a + 2)^2 + (3a + 1)^2$

Ans: $10a^2 + 10a + 5$

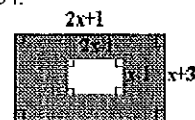
52. Simplify $(h - 2)(h + 3) - (h + 1)(h - 5)$

Ans: $5h - 1$

53. Simplify $(3t - 7)^2 - (t + 5)^2$

Ans: $8t^2 - 52t + 24$

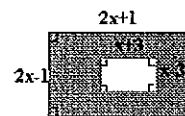
54.



Find an expression, in simplest form, for the area of the shaded region.

Ans: $10x + 2$

55.



Write an expression, in simplest form, for the area of the shaded region.

Ans: $3x^2 + 8$

56. A cuboid has a width of w cm. Its length is 5 cm longer than its width.

a) Write an expression for its length in terms of w . Its height is 2 cm less than its width.

b) Write an expression for its height in terms of w .

c) Write an expression for its volume in terms of w .

d) Expand and simplify the expression for the volume.

Ans: (a) $w + 5$; (b) $w - 2$; (c) $w(w + 5)(w - 2)$; (d) $w^3 + 3w^2 - 10w$

57. Three consecutive numbers are x , $x + 1$ and $x + 2$. Write, in simplest form, an expression for their product.

Ans: $x^3 + 3x^2 + 2x$

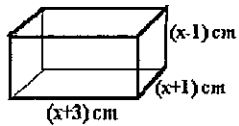
SECTION B

Ans: $x^3 + 3x^2 + 2x$

58. Three consecutive even numbers are $x - 2$, x and $x + 2$. Write, in simplest form, an expression for their product.

Ans: $x^3 - 4x$

59.



- (a) Write an expression, in expanded, simplest form, for the volume of the cuboid.
 (b) Use your answer to part (a) to find the volume for $x = 3$.
 (c) Check your answer to part (b) using another method.

Ans: (a) $V = (x^3 + 3x^2 - x - 3)\text{cm}^3$; (b) 48cm^3 ; (c) no answer given

60. Simplify $\frac{x}{5} + \frac{x}{7}$

Ans: $\frac{12x}{35}$

61. Simplify $\frac{m}{3} - \frac{m}{7}$

Ans: $\frac{4m}{21}$

62. Simplify $\frac{5x}{7} + \frac{3x}{7}$

Ans: $\frac{31x}{14}$

63. Simplify $\frac{3x+5}{5} + \frac{2x+1}{3}$

Ans: $\frac{19x+20}{15}$

64. Simplify $\frac{4a+3}{7} + \frac{3-2a}{5}$

Ans: $\frac{6a+36}{35}$

65. Simplify $\frac{3p-2}{4} - \frac{p+1}{3}$

Ans: $\frac{5p-10}{12}$

66. Simplify $\frac{2m-5}{6} - \frac{3m-2}{3}$

Ans: $\frac{-4m-1}{6}$

67. Simplify $\frac{5}{x} + \frac{7}{x}$

Ans: $\frac{12}{x}$

68. Simplify $\frac{4}{3x} + \frac{2}{x}$

Ans: $\frac{10}{3x}$

69. Simplify $\frac{3}{4x} + \frac{1}{2x}$

Ans: $\frac{5}{4x}$

70. Simplify $\frac{3}{7x} - \frac{2}{3x}$

Ans: $\frac{-5}{21x}$

71. Simplify $\frac{7}{2x} - \frac{3}{5x}$

Ans: $\frac{29}{10x}$

72. Simplify $\frac{8}{7x} - \frac{5}{9x}$

Ans: $\frac{37}{63x}$

73. Simplify $\frac{4}{3h-2} + \frac{6}{h-1}$

Ans: $\frac{22h-16}{(3h-2)(h-1)}$

74. Simplify $\frac{5}{6p-7} + \frac{8}{3p+1}$

Ans: $\frac{63p-51}{(6p-7)(3p+1)}$

75. Simplify $\frac{4}{2p-3} - \frac{8}{p-1}$

Ans: $\frac{-12p+20}{(2p-3)(p-1)}$

76. Simplify $\frac{5}{h-5} - \frac{2}{5-h}$

Ans: $\frac{7}{h-5}$

77. Simplify $\frac{t}{t+2} - \frac{2}{2+t}$

Ans: $\frac{t-2}{t+2}$

78. Simplify $\frac{y}{5-y} + \frac{5}{y-5}$

Ans: -1

79. Simplify $\frac{4}{(2x+1)(x+3)} + \frac{3}{(x+3)(x-1)}$

Ans: $\frac{10x-1}{(2x+1)(x+3)(x-1)}$

80. Simplify $\frac{5}{(4h-2)(h-3)} + \frac{7}{(h-3)(2h+1)}$

Ans: $\frac{38h-9}{(4h-2)(h-3)(2h+1)}$

81. Simplify $\frac{3}{(h-2)(h+2)} - \frac{2}{(h+2)(h-1)}$

Ans: $\frac{h+1}{(h-2)(h+2)(h-1)}$

82. Simplify $\frac{4}{(2m-1)(2m+3)} - \frac{5}{(3m-1)(2m-1)}$

Ans: $\frac{2m-19}{(2m-1)(2m+3)(3m-1)}$

83. Simplify $\frac{6}{(x+3)(2x-1)} - \frac{4}{(x+4)(1-2x)}$

Ans: $\frac{10x+36}{(x+3)(x+4)(2x-1)}$

84. Simplify $\frac{4}{(2a+1)^2} + \frac{3}{(2a+1)(a+3)}$

Ans: $\frac{10a+11}{(2a+1)^2(a+2)}$

85. Simplify $\frac{5}{(2a-3)(a+1)} + \frac{4}{(a+1)^2}$

Ans: $\frac{13a-7}{(2a-3)(a+1)^2}$

86. Simplify $\frac{3}{(a+2)^2} - \frac{2}{(a-3)(a+2)}$

Ans: $\frac{a-13}{(a+2)^2(a-3)}$

87. Show that $\frac{4}{(x+1)(x-2)} + \frac{5}{(x-2)(x+4)} = \frac{9x+21}{(x+1)(x-2)(x+4)}$

88. Show that $\frac{3}{(5p-1)(2p-3)} + \frac{4}{(2p-3)^2} = \frac{26p-13}{(2p-3)^2(5p-1)}$

89. Show that $\frac{p+1}{(p+5)(p-2)} - \frac{p}{(p+5)(p-3)} = \frac{-3}{(p+5)(p-2)(p-3)}$

90. Prove that $\frac{1}{x+1} + \frac{2}{x-1} + \frac{1}{x-2} = \frac{4x^2-5x-3}{(x-1)(x+1)(x-2)}$

91. Prove that $\frac{3}{x+4} + \frac{2}{x-1} - \frac{3}{1-x} = \frac{8x+17}{(x+4)(x-1)}$

92. Simplify $\frac{a+2}{a+3} \times \frac{a+3}{a+2}$

Ans: 1

93. Simplify $\frac{(a+1)(a-5)}{a+2} \times \frac{a+2}{a+1}$

Ans: a - 5

94. Simplify $\frac{(3p-2)(p+5)}{(p+7)(3p+2)} \times \frac{(p+7)(p-7)}{(3p-2)}$

Ans: $\frac{(p+5)(p-7)}{(3p+2)}$

95. Simplify $\frac{(x-7)(2x+3)}{(3x-2)(x+1)} \times \frac{(1+x)}{(3+2x)}$

Ans: $\frac{x-7}{3x-2}$

96. Simplify $\frac{(x-7)(x+7)}{(x+2)(x-2)} \times \frac{(2+x)(2-x)}{(7-x)(7+x)}$

Ans: 1

97. Simplify $\frac{3a^2(a-2)}{2a+3} + \frac{a(a+2)}{(a+1)(2a+3)}$

Ans: $\frac{3a(a+1)(a-2)}{(a+2)}$

98. Simplify $\frac{(a+3)(a-3)}{(a-7)(a-4)} \times \frac{(a-5)(a-4)}{3a-1} + \frac{(a-3)(a-5)}{a-7}$

Ans: $\frac{(a+3)(a-2)}{(a-3)(3a-1)}$

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