

Practice: Equivalent Expressions (Combine Like Terms)

1. Determine the value of the coefficient and the number of variables for each term.

a) $-t$ b) $4d^2$ c) 12 d) $-8de$ e) b f) $-c^2$

2. Match the expression with its description.

A $-4x$	_____ a constant
B 17	_____ a binomial with two variables
C $2ab$	_____ -1 is the coefficient
D $3y^2 - 2y$	_____ -4 is the coefficient
E $-m$	_____ a binomial with a degree of 2
F $5x - 3y$	_____ a monomial with a degree of 2

3. Identify the like terms in each group.

a) $4x, 4y, x^2, -x, y^2$	b) $6, 2x, -2.5, 3y, -0.1$
c) $a, 4b, -3ab, 7a, 1.5a$	d) $-f, 3ef, f^2, -6f^2, 5e$
e) $6st, -10s, \frac{3}{4}st, -st, t$	f) $pq, -0.6p^2, 5q, -p^2, 10p^2$
g) $0.5jk, -jk, j^2, 6jk, -k$	h) $0.12, r^2, 9, \frac{2}{5}, \frac{1}{2}r$

4. Collect like terms.

a) $3m - m^2 - 6 + 3m^2$	b) $-4k - k^2 + 5k - 7k^2 + 8$
c) $-c - c^2 + 3c + c^2$	d) $7 - 10 + 5n - n + 9 + 8n$
e) $-2b^2 - 7b + 3b^2 - 8b + b$	f) $w^2 - 3w - 8w^2 + 7w^2 + 10w$
g) $-2a - 1 - a - 7 - 5a$	h) $3s + 6 - 6s^2 - 8 + 7s - 2s^2$

5. A rectangle's length is 7 cm greater than its width, w .

a) Draw the rectangle and label its dimensions.
b) Write the expression to find its perimeter.
c) Collect like terms.

6. Which of the following expressions are equivalent to the simplified expression $-3x^2 + x - 4$?

A $-4 + 3x^2 + x$
B $x - 4 - 3x^2$
C $x^2 + 2 - 4x^2 + 3x - 6 - 2x$
D $-3 - 5x^2 + x + 1 + 2x^2$
E $2x - 2 + x^2 - x - 4x^2 - 2$
F $-4 - 3x - 3x^2 - 0 + 5x^2 + 4x - 6x^2$

11. Use algebra tiles to model each polynomial, then combine like terms. Sketch the tiles.

- $2c + 3 + 3c + 1$
- $2x^2 + 3x - 5x$
- $3f^2 + 3 - 6f^2 - 2$
- $3b^2 - 2b + 5b + 4b^2 + 1$
- $5t - 4 - 2t^2 + 3 + 6t^2$
- $4a - a^2 + 3a - 4 + 2a^2$

12. Simplify each polynomial.

- $2m + 4 - 3m - 8$
- $4 - 5x + 6x - 2$
- $3g - 6 - 2g + 9$
- $-5 + 1 + h - 4h$
- $-6n - 5n - 4 - 7$
- $3s - 4s - 5 - 6$

13. Simplify each polynomial.

- $6 - 3x + x^2 + 9 - x$
- $5m - 2m^2 - m^2 + 5m$
- $5x - x^2 + 3x + x^2 - 7$
- $3p^2 - 2p + 4 + p^2 + 3$
- $a^2 - 2a - 4 + 2a - a^2 + 4$
- $-6x^2 + 17x - 4 - 3x^2 + 8 - 12x$

14. Simplify each polynomial.

- $3x^2 + 5y - 2x^2 - 1 - y$
- $pq - 1 - p^2 + 5p - 5pq - 2p$
- $5x^2 + 3xy - 2y - x^2 - 7x + 4xy$
- $3r^2 - rs + 5s + r^2 - 2rs - 4s$
- $4gh + 7 - 2g^2 - 3gh - 11 + 6g$
- $-5s + st - 4s^2 - 12st + 10s - 2s^2$

15. Identify the equivalent polynomials.

Justify your answers.

- $1 + 5x$
- $6 - 2x + x^2 - 1 - x + x^2$
- $4x^2 - 7x + 1 - 7x^2 + 2x + 3$
- $4 - 5x - 3x^2$
- $2x^2 - 3x + 5$
- $3x + 2x^2 + 1 - 2x^2 + 2x$

16. Write 3 different polynomials that simplify to $-2a^2 + 4a - 8$.

17. Write a polynomial with degree 2 and 5 terms, which has only 2 terms when it is simplified.

18. Assessment Focus

- A student is not sure whether $x + x$ simplifies to $2x$ or x^2 .
Explain how the student can use algebra tiles to determine the correct answer.
What is the correct answer?
- Simplify each polynomial. How do you know that your answers are correct?
 - $-2 + 4r - 2r + 3$
 - $2t^2 - 3t + 4t^2 - 6t$
 - $3c^2 + 4c + 2 + c^2 + 2c + 1$
 - $15x^2 - 12xy + 5y + 10xy - 8y - 9x^2$
- Create a polynomial that cannot be simplified. Explain why it cannot be simplified.

19. Write a polynomial to represent the perimeter of each rectangle.

- a) $x \quad x \quad x \quad x \quad x$

- b) $x \quad x \quad \begin{matrix} \diagup 1 \\ \diagdown 1 \end{matrix}$

- c) $x \quad x \quad x$

- d) $x \quad x \quad x \quad x \quad \begin{matrix} \diagup 1 \\ -1 \\ \diagdown 1 \end{matrix}$