

N: # 6, 7, 11, 12 A: # 6, 7, 12, 13 E: # 6, 11, 14, 22

Practice

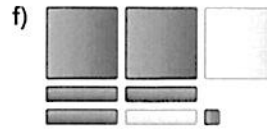
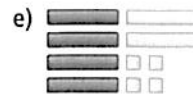
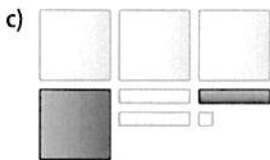
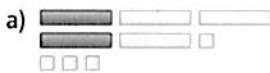
"Like Terms"

Check

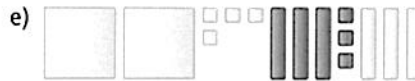
4. a) Use algebra tiles to model $3d$ and $-5d$. Sketch the tiles.
b) Are $3d$ and $-5d$ like terms? How can you tell from the tiles? How can you tell from the monomials?
5. a) Use algebra tiles to model $4p$ and $2p^2$. Sketch the tiles.
b) Are $4p$ and $2p^2$ like terms? How can you tell from the tiles? How can you tell from the monomials?

Apply

6. From the list, which terms are like $8x$?
 $-3x, 5x^2, 4, 3x, 9, -11x^2, 7x, -3$
Explain how you know they are like terms.
7. From the list, which terms are like $-2n^2$?
 $3n, -n^2, -2, 4n, 2n^2, -2, 3, 5n^2$
Explain how you know they are like terms.
8. For each part, combine tiles that represent like terms.
Write the simplified polynomial.



9. Identify the equivalent polynomials in the diagrams below. Justify your answers.



10. A student made these mistakes on a test.

➤ The student simplified $2x + 3x$ as $5x^2$.

➤ The student simplified $4 + 3x$ as $7x$.

Use algebra tiles to explain what the student did wrong.

What are the correct answers?

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.

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

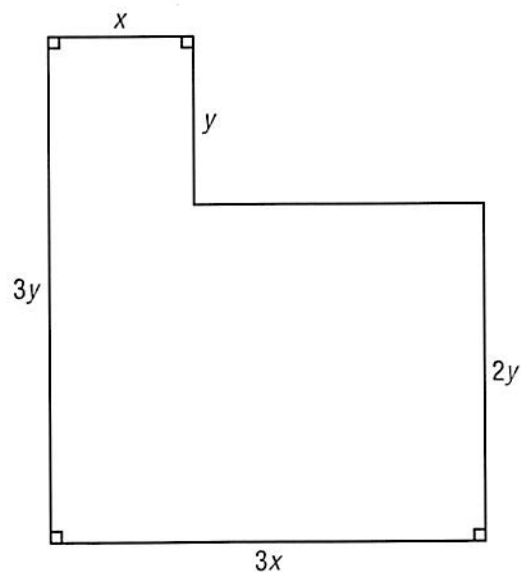
16. Write 3 different polynomials that simplify to $-2a^2 + 4a - 8$.

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.

22. Write a polynomial for the perimeter of this shape. Simplify the polynomial.



Answer Key

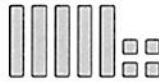

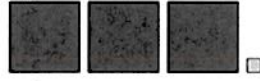
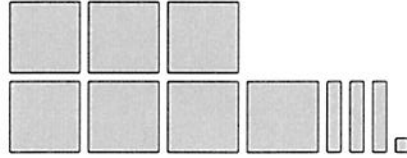
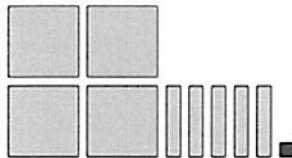

b) $4p$ and $2p^2$ are unlike terms because they cannot be modelled by algebra tiles of the same shape and size. They have the same variable, but raised to different exponents.

6. $-3x, 3x, 7x$; they have the same variable raised to the same exponent.
 7. $-n^2, 2n^2, 5n^2$; they have the same variable raised to the same exponent.

8. a) $x + 4$ b) $x - 2$
 c) $2x^2 + x + 1$ d) $5x^2 - 3x + 1$
 e) $-2x + 4$ f) $-x^2 - 2x - 1$

9. Parts a and e are equivalent; both simplify to $2x^2 + 1$. Parts b and f are equivalent; both simplify to $-x - 3$. Parts c and d are equivalent; both simplify to $-x^2 + 2x$.

10. $2x + 3x = 5x$; $4 + 3x$ cannot be simplified.

11. a) $5c + 4$

 b) $2x^2 - 2x$

 c) $-3f^2 + 1$

 d) $7b^2 + 3b + 1$

 e) $4t^2 + 5t - 1$

 f) $a^2 + 7a - 4$


12. a) $-m - 4$ b) $x + 2$
 c) $g + 3$ d) $-3h - 4$
 e) $-11n - 11$ f) $-s - 11$
 13. a) $x^2 - 4x + 15$ b) $-3m^2 + 10m$
 c) $8x - 7$ d) $4p^2 - 2p + 7$
 e) 0 f) $-9x^2 + 5x + 4$
 14. a) $x^2 + 4y - 1$ b) $-p^2 + 3p - 4pq - 1$
 c) $4x^2 - 7x + 7xy - 2y$ d) $4r^2 - 3rs + s$
 e) $-2g^2 + 6g + gh - 4$ f) $-6s^2 + 5s - 11st$

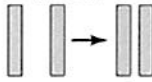
15. Parts a and f are equivalent; both simplify to $5x + 1$. Parts b and e are equivalent; part b simplifies to $2x^2 - 3x + 5$. Parts c and d are equivalent; part c simplifies to $-3x^2 - 5x + 4$.

16. Answers will vary. For example:

$$5a^2 - 7a^2 + 6a - 2a - 8$$

17. Answers will vary. For example:

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

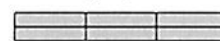
18. a) $x + x = 2x$

 $x + x = 2x$

- b) i) $2r + 1$ ii) $6r^2 - 9t$
 iii) $4c^2 + 6c + 3$ iv) $6x^2 - 2xy - 3y$

c) Answers will vary. For example: $-8d^2 - 3d - 4$

19. a) $5x + x + 5x + x = 12x$
 b) $2x + 2 + 2x + 2 = 4x + 4$
 c) $3x + 2x + 3x + 2x = 10x$
 d) $4x + 3 + 4x + 3 = 8x + 6$

20. a) 5 rectangles; for example:



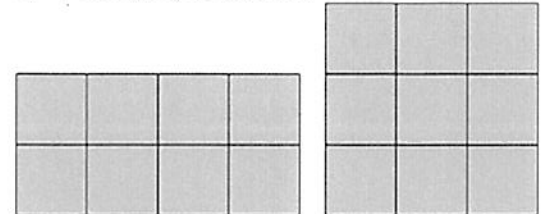
b) 1 rectangle



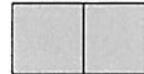
c) 4 rectangles; for example:



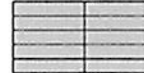
d) 3 rectangles; for example:



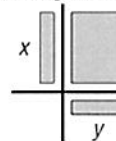
e) 1 rectangle



f) 8 rectangles; for example:



21. An xy tile would be a rectangle with dimensions equal to the lengths of the x -tile and the y -tile.



22. $x + y + 2x + 2y + 3x + 3y = 6x + 6y$ Simplified