

## Chapter 5 Test

1. Represent each binomial product using a diagram.

- a)  $(x + 3)(2x + 1)$   
b)  $(2x + 3)(3x + 2)$

2. Expand and simplify.

- a)  $3x^2y(y^2x + 4xy - 2y^2)$   
b)  $-4(x^2 + 3x - 11) + 5x(x - 4)$

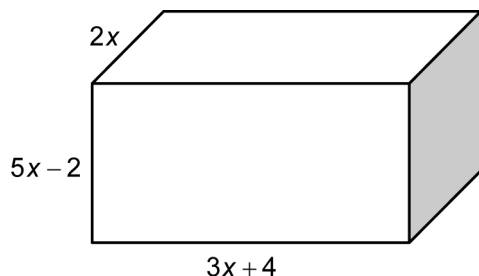
3. Expand and simplify.

- a)  $(k + 4)(k - 1)$   
b)  $(6x - 1)(x - 5)$   
c)  $2(3x - 2)^2 - 3(x - 1)(x + 5)$   
d)  $(2x - 3y)^2 + 2y(y - x)$   
e)  $6(1 - x)(x + 4) - 2(5 - 2x)^2$

4. In baseball, the first base bag is a square. Its side length can be represented by the expression  $5x + 3$ .

- a) Write and expand an expression to represent the area of the top of the bag.  
b) If  $x$  represents 7 cm, what is the area of the top of the bag, in square centimetres?

5. a) Write an algebraic expression for the volume of the rectangular prism.



- b) Expand and simplify the expression.  
c) Find the volume if  $x = 1$  cm.

6. Factor.

- a)  $x^2 - 10x + 25$   
b)  $4x^2 - 12x + 9$   
c)  $2y^2 + 5y + 2$   
d)  $3k^2 - 11k - 4$   
e)  $10r^2 + r - 3$   
f)  $6s^2 - 11st - 10t^2$

7. Factor fully, if possible.

- a)  $21x^2 + 21x - 42$   
b)  $7g^2 + 28g - 147$   
c)  $3x^2 + 11x - 13$   
d)  $c^3 - 9c$   
e)  $6d^2 - 13d + 6$   
f)  $50x^2 - 72$

8. A stone is thrown straight down from a tall building. The relation  $h = 150 - 5t - 5t^2$  approximates its path, with  $h$  in metres and  $t$  in seconds.

- a) How tall is the building?  
b) Factor the right side of the equation fully.  
c) When does the stone hit the ground?

9. The North Stone Pyramid at Dahshur in Egypt has a square base with an area that can be represented by the trinomial  $9x^2 - 12x + 4$ .

- a) Factor the trinomial to find a binomial to represent the side length of the base of the pyramid.  
b) If  $x$  represents 74 m, what is the side length of the base, in metres?

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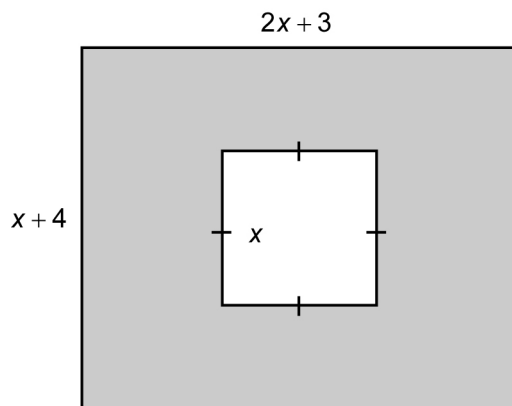
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**BLM 5-14**  
(page 2)

10. Determine the value(s) of  $k$  so that each trinomial can be factored as a perfect square.

- a)  $x^2 - 12x + k$
- b)  $9x^2 + kx + 25$
- c)  $kx^2 - 4x + 1$
- d)  $16y^2 + ky + 9$
- e)  $x^2 + kx + 36$
- f)  $4x^2 - 24x + k$
- g)  $36x^2 - kxy + 49y^2$
- h)  $49x^2 - 42xy + ky^2$

11. Write and simplify an algebraic expression for the area of the shaded region.



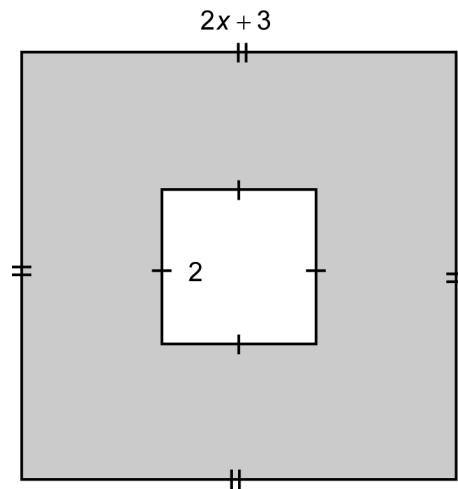
12. The area of a rectangle is represented by the equation  $A = 6x^2 + 5x - 4$ .

- a) Factor the right side of the equation fully to find expressions for the length and width of the rectangle.
- b) Find an expression for the perimeter of the rectangle.
- c) If  $x$  represents 7 cm, find the area and the perimeter of the rectangle.

13. Explain how to determine the value(s) of  $k$  that would make  $x^2 + kx + 100$  a perfect square trinomial.

14. If  $a$  and  $b$  are integers, find values of  $a$  and  $b$  so that  $a^2 - b^2$  is 21.

15. a) Write an expression for the shaded area in the diagram.



- b) Factor this expression.

- c) Find the area of the shaded region if  $x = 3$  cm.