

LESSON
4.1

Practice B

For use with pages 220–227

For the following functions (a) tell whether the graph *opens up* or *opens down*, (b) find the vertex, and (c) find the axis of symmetry.

1. $y = -3x^2 + 1$

2. $y = -2x^2 - 1$

3. $y = 3x^2 - 2x$

4. $y = -4x^2 - 2x + 9$

5. $y = 5x^2 - 5x + 7$

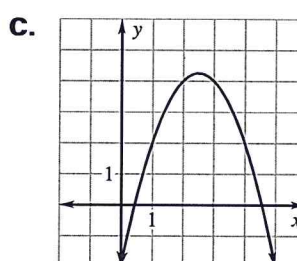
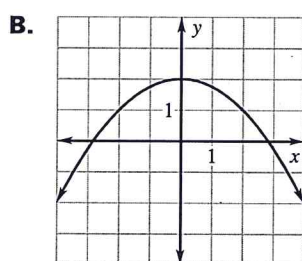
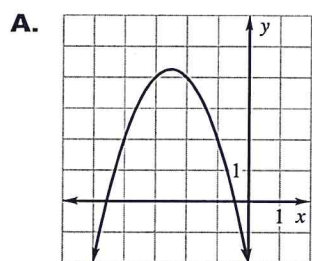
6. $y = -2x^2 - 3x + 3$

Match the equation with its graph. Then state the domain and range.

7. $y = -x^2 + 5x - 2$

8. $y = -x^2 - 5x - 2$

9. $y = -\frac{1}{4}x^2 + 2$

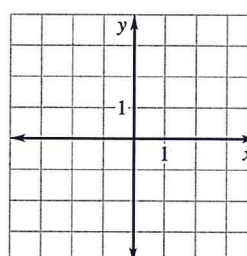
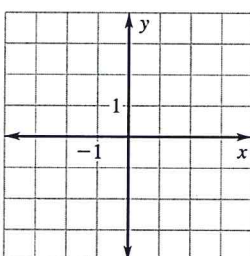
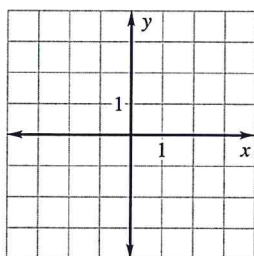


Graph the function. Label the vertex and axis of symmetry.

10. $y = x^2 - 3$

11. $y = -2x^2 + 4x$

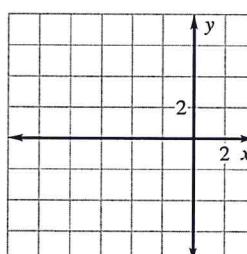
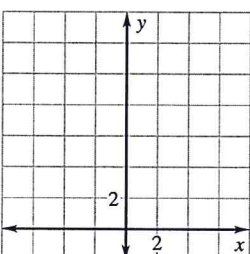
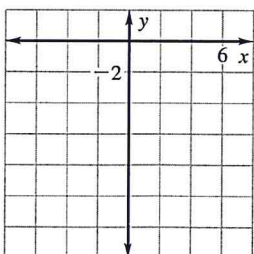
12. $y = 2x^2 + 6x + 1$



13. $y = 4x^2 - 16x + 3$

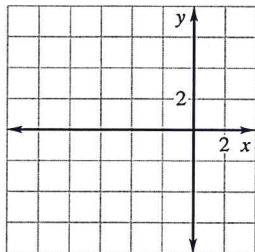
14. $y = -3x^2 - 12x + 1$

15. $y = \frac{1}{3}x^2 + 2x - 1$

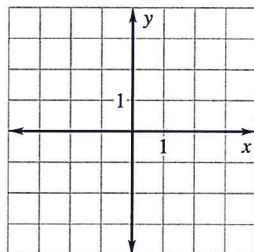


LESSON
4.1**Practice B** *continued*
For use with pages 220–227

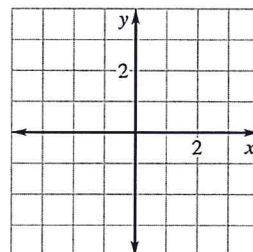
16. $y = x^2 + 5x - 1$



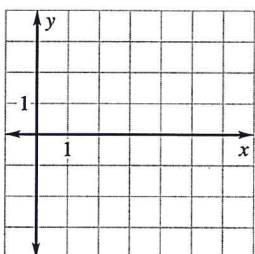
17. $y = 3x^2 + 3x - 2$



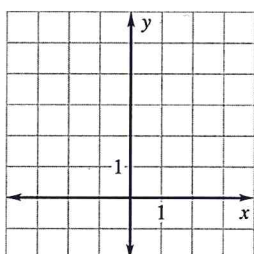
18. $y = -5x^2 + 4x + 2$



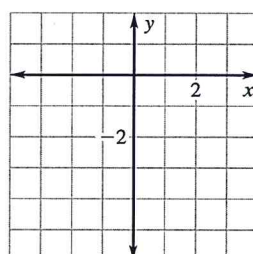
19. $y = -\frac{1}{2}x^2 + 3x - 1$



20. $y = -2x^2 - 4x + 3$



21. $y = 2x^2 - 4x - 2$



In Exercises 22–24, use the following information.

Minimize Cost A baker has modeled the monthly operating costs for making wedding cakes by the function $y = 0.5x^2 - 12x + 150$ where y is the total cost in dollars and x is the number of cakes prepared.

22. Find the vertex and axis of symmetry.
23. What is the minimum cost?
24. How many cakes should be prepared each month to yield the minimum cost?

In Exercises 25 and 26, use the following information.

Maximize Revenue A sports store sells about 50 mountain bikes per month at a price of \$220 each. For each \$20 decrease in price, about 10 more bikes per month are sold.

25. Write a quadratic function in standard form that models the revenue from bike sales.
26. What price produces the maximum revenue?

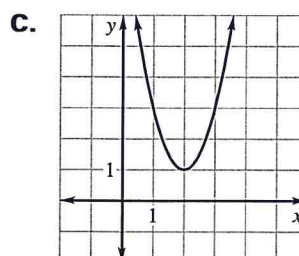
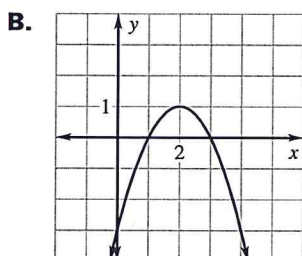
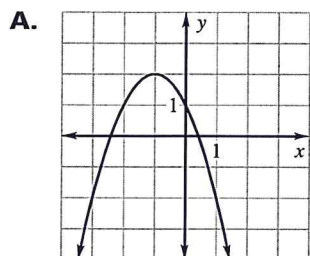
LESSON 4.2 **Practice B**
For use with pages 229–235

Match the equation with its graph.

1. $y = 2(x - 2)^2 + 1$

2. $y = -(x - 3)(x - 1)$

3. $y = -(x + 1)^2 + 2$

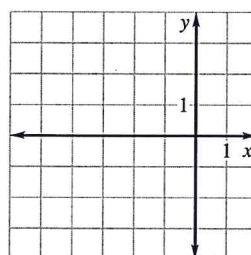
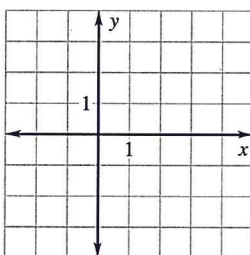
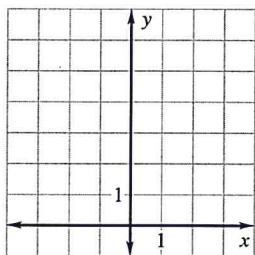


Graph the function. Label the vertex and axis of symmetry.

4. $y = (x + 1)^2 + 3$

5. $y = (x - 2)^2 - 1$

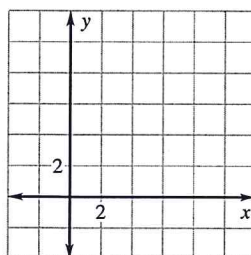
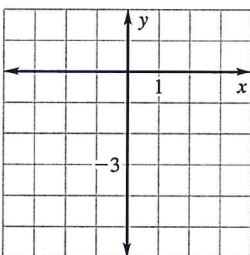
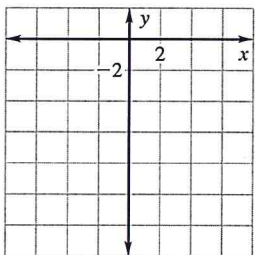
6. $y = (x + 2)^2 - 3$



7. $y = -2(x + 1)^2 - 4$

8. $y = 2(x + 2)^2 - 4$

9. $y = -(x - 4)^2 + 8$

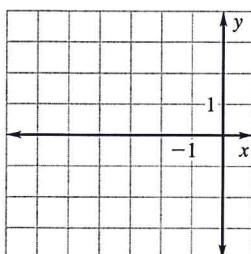
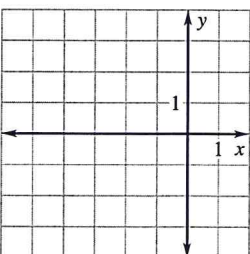
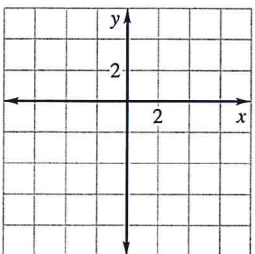


Graph the function. Label the vertex, axis of symmetry, and x-intercepts.

10. $y = (x + 2)(x - 4)$

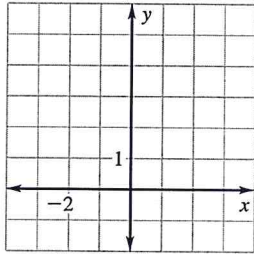
11. $y = (x + 2)(x + 3)$

12. $y = (x + 4)(x + 2)$

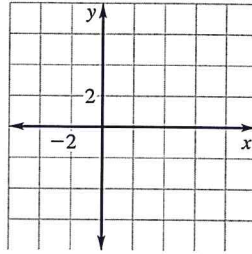


LESSON
4.2**Practice B** *continued*
For use with pages 229–235

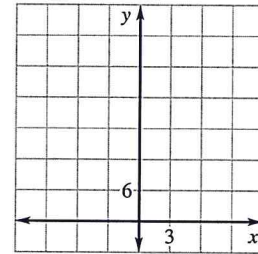
13. $y = -(x - 3)(x + 1)$



14. $y = 3(x - 1)(x - 4)$



15. $y = -3x(x + 7)$

**Write the quadratic function in standard form.**

16. $y = (x - 2)^2 + 6$

17. $y = -2(x + 1)^2 + 3$

18. $y = 3(x - 3)^2 - 12$

19. $y = (x - 4)(x - 2)$

20. $y = 4(x + 1)(x + 2)$

21. $y = -3(x - 3)(x + 2)$

Find the minimum value or the maximum value of the function. State the domain and range.

22. $y = (x - 6)^2 + 3$

23. $y = -(x - 3)^2 - 4$

24. $y = 3(x - 3)^2 - 3$

25. $y = (x + 7)(x + 3)$

26. $y = 2(x - 3)(x - 5)$

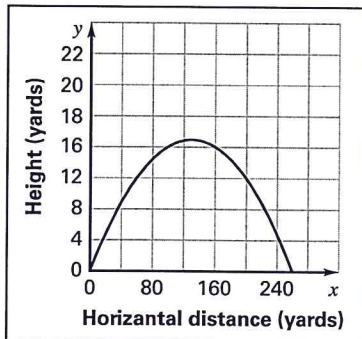
27. $y = -(x - 1)(x + 4)$

- 28. Visual Thinking** Use a graphing calculator to graph $y = a(x - 2)(x - 6)$ where $a = \frac{1}{2}$, 1, and 4. Use the same viewing window for all three graphs. How do the graphs change as a increases?

In Exercises 29 and 30, use the following information.

Golf The flight of a particular golf shot can be modeled by the function $y = -0.001x(x - 260)$ where x is the horizontal distance (in yards) from the impact point and y is the height (in yards). The graph is shown below.

- 29.** How many yards away from the impact point does the golf ball land?
30. What is the maximum height in yards of the golf shot?



LESSON
4.3**Practice B**

For use with pages 236–242

Factor the expression. If the expression cannot be factored, say so.

- | | | |
|---------------------|----------------------|---------------------|
| 1. $x^2 + 4x - 21$ | 2. $x^2 - 6x + 5$ | 3. $x^2 + 6x + 8$ |
| 4. $x^2 - x - 6$ | 5. $x^2 - x - 12$ | 6. $x^2 - 2x - 8$ |
| 7. $x^2 - 9x + 20$ | 8. $x^2 + 3x - 18$ | 9. $x^2 - 9$ |
| 10. $x^2 + 8x + 16$ | 11. $x^2 - 11x + 28$ | 12. $x^2 - 2x + 2$ |
| 13. $x^2 + 4x - 32$ | 14. $x^2 - 3x - 10$ | 15. $x^2 - 25$ |
| 16. $x^2 - 9x + 14$ | 17. $x^2 - 100$ | 18. $x^2 - 8x - 15$ |

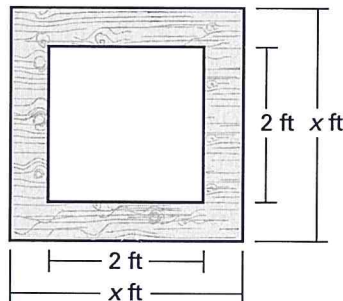
Solve the equation.

- | | | |
|------------------------|--------------------------|--------------------------|
| 19. $x^2 + x - 6 = 0$ | 20. $x^2 + 3x - 10 = 0$ | 21. $x^2 - 5x + 6 = 0$ |
| 22. $x^2 - 4x + 4 = 0$ | 23. $x^2 + 7x + 12 = 0$ | 24. $x^2 - 3x - 28 = 0$ |
| 25. $x^2 - 36 = 0$ | 26. $x^2 - 2x - 15 = 0$ | 27. $x^2 - 11x + 18 = 0$ |
| 28. $3x^2 = 48$ | 29. $x^2 - 7x - 4 = -10$ | 30. $9x - 8 = x^2$ |

Find the zeros of the function by rewriting the function in intercept form.

- | | | |
|-----------------------------|----------------------------|----------------------------|
| 31. $y = x^2 + 8x + 15$ | 32. $y = x^2 - 12x + 32$ | 33. $f(x) = x^2 - 2x - 35$ |
| 34. $y = x^2 - x - 30$ | 35. $g(x) = x^2 + 10x + 9$ | 36. $y = x^2 - 6x$ |
| 37. $h(x) = x^2 - 12x + 27$ | 38. $y = x^2 - 9$ | 39. $y = x^2 + 16x + 64$ |

40. **Picture Frame** You are making a square frame of uniform width for a square picture that has side lengths of two feet. The total area of the frame is five square feet. What is the length of the sides of the frame?



41. **Concert Stage** The dimensions of the old stage at the concert hall were 30 feet wide and 15 feet deep. The new stage has a total area of 1000 square feet. The dimensions of the new stage were created by adding the same distance x to the width and the depth of the old stage dimensions. What is the value of x ?

LESSON
4.4**Practice B**

For use with pages 243–249

Factor the expression. If the expression cannot be factored, say so.

- | | | |
|-----------------------|-----------------------|------------------------|
| 1. $3x^2 + 10x - 8$ | 2. $2x^2 + 5x - 3$ | 3. $4x^2 + 4x + 1$ |
| 4. $2x^2 - 5x + 1$ | 5. $4x^2 + 5x - 6$ | 6. $2x^2 + 11x + 15$ |
| 7. $9x^2 + 12x + 4$ | 8. $12x^2 - 24x + 9$ | 9. $18x^2 - 2$ |
| 10. $12x^2 + 17x + 6$ | 11. $15x^2 + 8x - 16$ | 12. $4x^2 - 5$ |
| 13. $12x^2 - 39x + 9$ | 14. $18x^2 - 9x - 14$ | 15. $20x^2 - 54x + 36$ |
| 16. $42x^2 + 35x + 7$ | 17. $-12x^2 - x + 11$ | 18. $80x^2 + 68x + 12$ |

Solve the equation.

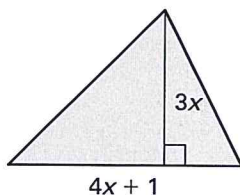
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|----------------------------------|--|
| 19. $2x^2 + 3x - 2 = 0$ | 20. $2x^2 - 3x - 9 = 0$ |
| 21. $4x^2 - 8x + 3 = 0$ | 22. $9x^2 - 4 = 0$ |
| 23. $8x^2 - 6x + 1 = 0$ | 24. $18x^2 + 48x = -32$ |
| 25. $9x^2 + 11x + 18 = -10x + 8$ | 26. $5x^2 - 2x - 6 = -3x^2 + 6x$ |
| 27. $5x^2 - 3x + 3 = -2x^2 + 3$ | 28. $25x^2 - 24x - 9 = -7x^2 + 12x - 18$ |

Find the zeros of the function by rewriting the function in intercept form.

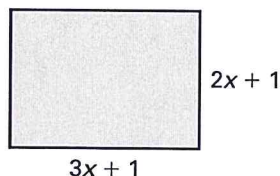
- | | |
|------------------------------|----------------------------|
| 29. $y = 3x^2 + 2x$ | 30. $y = 12x^2 + 8x - 15$ |
| 31. $f(x) = 5x^2 - 25x + 30$ | 32. $y = 25x^2 + 10x - 24$ |
| 33. $g(x) = 33x^2 - 9x - 24$ | 34. $y = 4x^2 + 1$ |

Find the value of x .

35. Area of the triangle = 27



36. Area of the rectangle = 22



37. **Picture Frame** You are making a frame of uniform width for a picture that is to be displayed at the local museum. The picture is 3.25 feet tall and 3 feet wide. The museum has allocated 15 square feet of wall space to display the picture. What should the width of the frame be in order to use all of the allocated space?

