

Name: _____

Course/Section: _____

Instructor: _____

Chapter 18 Quadratic Functions and Equations

18.3 Quadratic Equations

Basics of Quadratic Equations ~ The Square Root Property ~ Completing the Square ~ Solving an Equation for a Variable ~ Applications of Quadratic Equations

STUDY PLAN

Read: Read Section 18.3 on pages 1180-1189 in your textbook or eText.

Practice: Do your assigned exercises in your Book MyMathLab Worksheets

Review: Keep your corrected assignments in an organized notebook and use them to review for the test.

Key Terms

Exercises 1-2: Use the vocabulary terms listed below to complete each statement.

Note that some terms or expressions may not be used.

quadratic equation

square root property

1. A(n) _____ can be written as $ax^2 + bx + c = 0$, where a , b , and c are constants with $a \neq 0$.
2. The _____ states that if k is a nonnegative number, then the solutions to the equation $x^2 = k$ are given by $x = \pm\sqrt{k}$.

Basics of Quadratic Equations

Exercises 1-3: Refer to Example 1 on pages 1181-1183 in your text and the Section 18.3 lecture video. **Graph these three equations.**

Solve each quadratic equation. Support your results numerically and graphically.

1. $2x^2 + 5 = 0$ 1. _____

2. $x^2 + x - 6 = 0$ 2. _____

3. $x^2 + 1 = 2x$ 3. _____

The Square Root Property

Exercises 4-7: Refer to Examples 2-3 on page 1184 in your text and the Section 18.3 lecture video.

Solve each equation.

4. $x^2 = 8$ 4. _____

5. $4x^2 - 25 = 0$ 5. _____

6. $(x+3)^2 = 16$ 6. _____

7. An object falls from a height of 80 feet. How long does it take for the object to hit the ground? $h(t) = 80 - 16t^2$ 7. _____

Completing the Square

Exercises 8-10: Refer to Examples 4-6 on pages 1185-1186 in your text and the Section 18.3 lecture video.

8. Find the term that should be added to $x^2 + 8x$ to form a perfect square trinomial. 8. _____

9. Solve the equation $x^2 + 4x - 3 = 0$. 9. _____

10. Solve the equation $2x^2 - 5x = 4$. 10. _____

Solving an Equation for a Variable

Exercises 11-12: Refer to Example 7 on page 1187 in your text and the Section 18.3 lecture video.

Solve each equation for the specified variable.

11. $x = 9y^2 + 1$, for y 11. _____

12. $V = \pi r^2 h$, for r 12. _____
(Hint: $r > 0$.)

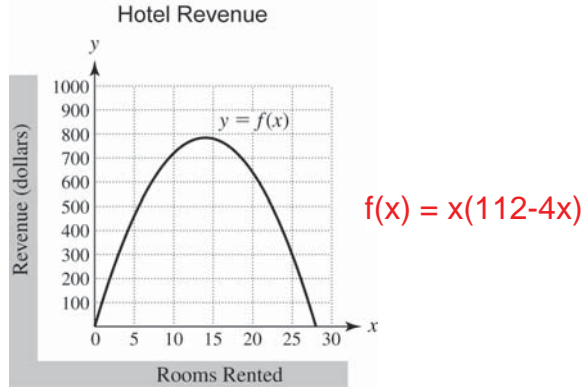
Applications of Quadratic Equations

Exercises 13-14: Refer to Examples 8-9 on pages 1187-1188 in your text and the Section 18.3 lecture video.

13. Find a safe speed limit x for a curve with a radius of 200 feet by using the equation $R = \frac{1}{2}x^2$. 13. _____

14. The function $f(x) = 0.0066x^2 - 23.76x + 21,389$ models the population of the United States in millions from 1800 through 2000, where $x = 1800$ corresponds to the year 1800, etc. Determine the approximate population of the United States in the year 1950. 14. _____

- 15 A hotel is considering giving the following group discount on room rates. The regular price for a room is \$112, but for each room rented the price decreases by \$4. A graph of the revenue received from renting x rooms is shown.



(a) Interpret the graph.

10.(a) _____

(From the graph)

(b) What is the maximum revenue? How many rooms should be rented to receive the maximum revenue?

(b) _____

(c) Use $f(x)$ to calculate when Revenue will be \$0.

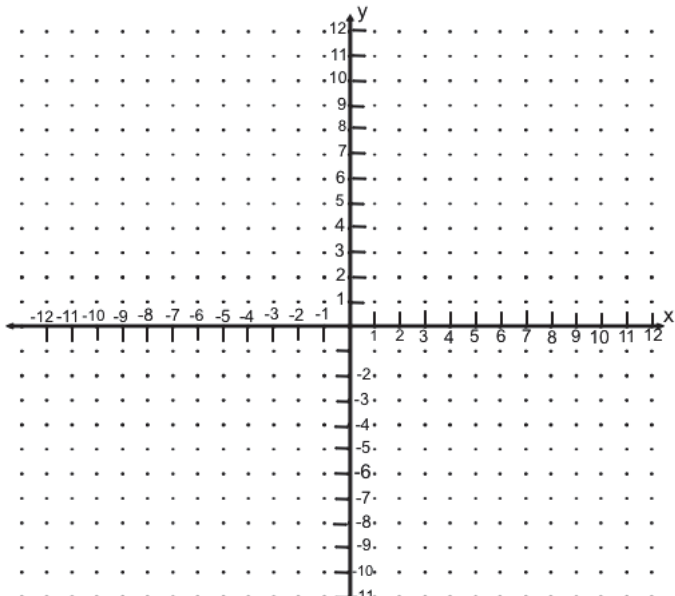
(c) _____

(d) Use $f(x)$ to determine symbolically the maximum revenue and the number of rooms that should be rented.

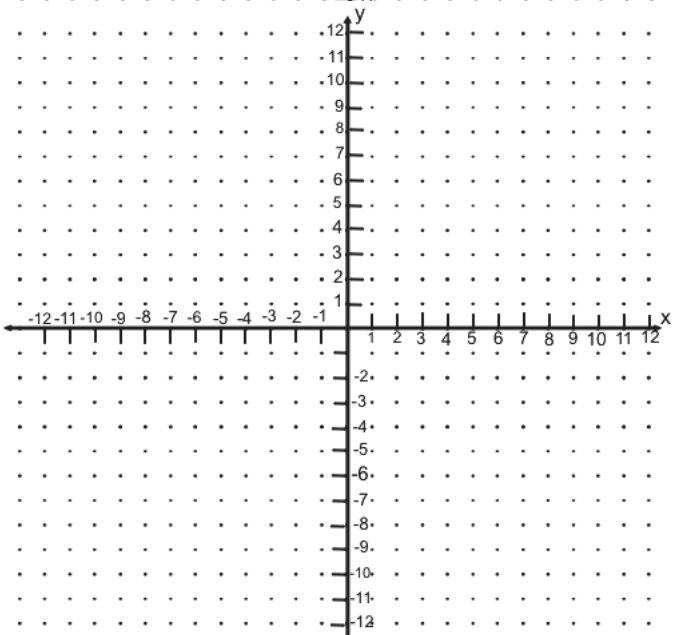
(d) _____

Name _____ HW Sec _____

Prob _____



Prob _____



Prob _____

