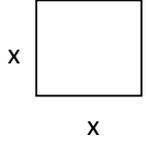
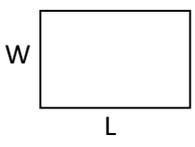
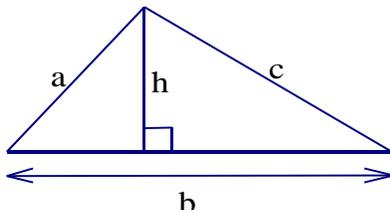
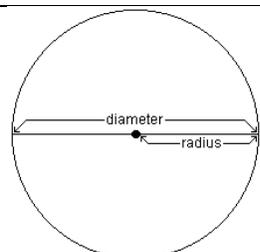


# Applications of Quadratic Equations

## Objective 1: Perimeter and Area Problems

	Square	Rectangle	Triangle	Circle
Learn these formulas				
Perimeter	$P = 4x$	$P = 2L + 2W$	$P = a + b + c$	Circumference $C = 2\pi r$ or $C = \pi d$
Area	$A = x^2$	$A = LW$	$A = \frac{1}{2}bh$	$A = \pi r^2$

**Example:** The area of a triangle is 112 square meters. The height is two meters longer than the base. What are the dimensions of the triangle?

**Example:** The area of a circle is 12 square inches. What is the radius of the circle?

## Objective 2: Work Rate Problems

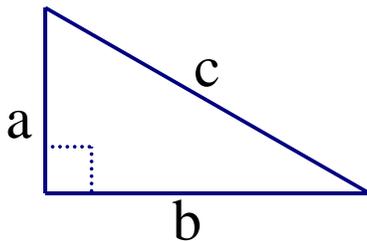
**Example:** It takes Gianna two hours longer to paint a room than it does Bryson. It takes 7 hours for the two of them to paint the room if they are working together. How long does it take each one of them if they each did the job by themselves?

**Pause the video and try these problems on your own. Once you have finished, restart the video and review the answers.**

Solve the following word problems.

1. The area of a triangle is 135 square meters. The base is 3 meters longer than the height. What are the dimensions of the triangle?
  
  
  
  
  
  
  
  
  
  
2. The area of a circle is 21 square inches. What is the radius of the circle?
  
  
  
  
  
  
  
  
  
  
3. If Sara and George work together they can paint a room in 11 hours. If Sara paints the room by herself, it would take her three hours less time than if George did the job by himself. How long does it take each one of them if they each did the job by themselves?

### Objective 3: Pythagorean Theorem Applications



$$a^2 + b^2 = c^2$$

**Example:** The diagonal of a square is 26 feet. What is the length of one of the sides?

**Example:** A guy wire for an antenna is 27 yards long. The height of the antenna is 18 yards. How far from the base of the antenna should the guy wire be anchored to the ground?

#### Objective 4: Consecutive Integer Problems

Consecutive integers:  $x, x+1, x+2, \dots$   
Consecutive even integers:  $x, x+2, x+4, \dots$   
Consecutive odd integers:  $x, x+2, x+4, \dots$  } where  $x$  is an integer

**Example:** The product of two consecutive **odd** integers is 23 more than five times their sum. Find the integers.

**Pause the video and try these problems on your own. Once you have finished, restart the video and review the answers.**

Solve the following word problems.

1. A square table has a diagonal of 78 inches. What is the length of one of the sides?

2. A guy wire for an antenna is 15 yards long. The height of the antenna is 11 yards. How far from the base of the antenna should the guy wire be anchored to the ground?
3. The product of two consecutive **odd** integers is 19 more than four times their sum. Find the integers.

### Objective 5: Projectile Problems

**Example:** The height, in feet, of a ball thrown upward from a height of 18 ft. is  $h = -16t^2 + 32t + 18$  after  $t$  seconds. How many seconds will it take for the ball to reach a height of 30 ft.?

**Example:** The height, in feet, of a ball thrown upward from a height of 6 ft. is  $h = -16t^2 + 32t + 6$  after  $t$  seconds. How many seconds will it take for the ball to hit the ground?

## Objective 6: Compound Interest Problems

For interest that is compounded annually, use the formula  $A = P(1 + r)^t$  where A is the amount in the account at the end of the term, P is the amount invested, t is the number of years and r is the interest rate.

**Example:** Find the rate r at which \$500 compounded annually grows to \$525 in 2 years. Round your answer to the nearest tenth of a percent.

## Objective 7: Distance, Rate, Time Problems

**Example:** Sharon and Jill each drove from their home in St. George, Utah to Salt Lake City, a distance of 330 miles. Sharon drove 11 mph faster than Jill did. Sharon arrived one hour before Jill did. How fast did each of them drive?

**Pause the video and try these problems on your own. Once you have finished, restart the video and review the answers.**

Solve the following word problems.

1. The height, in feet, of a ball thrown upward from a height of 7 ft. is  $h = -16t^2 + 32t + 7$  after  $t$  seconds. How many seconds will it take for the ball to hit the ground?

2. The height, in feet, of a ball thrown upward from a height of 15 ft. is  $h = -16t^2 + 32t + 15$  after  $t$  seconds. How many seconds will it take for the ball to reach a height of 20 ft.?
  
3. Find the rate  $r$  at which \$2000 compounded annually grows to \$2890 in 2 years. Use the formula  $A = P(1+r)^t$  where  $A$  is the amount in the account at the end of the term,  $P$  is the amount invested,  $t$  is the number of years and  $r$  is the interest rate. Round your answer to the nearest tenth of a percent.
  
4. Kaleb and Teagan each drove from their home in Springfield, Missouri to Oklahoma City, a distance of 280 miles. Kaleb drove 15 mph slower than Teagan did. Kaleb arrived 1.5 hours after Teagan did. How fast did each of them drive?