

EXTRA PRACTICE 32

Solving Problems Using Quadratic Equations

Use after Sections 11.1 and 11.3

Name _____

Example: \$3600 was invested at interest rate r , compounded annually. In 2 years, it grew to \$3969. What was the interest rate?

We use the compound-interest formula, $A = P(1+r)^t$, to solve this problem.

$A = \$3969$, $P = \$3600$, $t = 2$, and we solve for r .

$$A = P(1+r)^t$$

$$3969 = 3600(1+r)^2$$

$$\frac{3969}{3600} = (1+r)^2$$

$$\pm \sqrt{\frac{3969}{3600}} = 1+r$$

$$\pm \frac{63}{60} = 1+r$$

$$-\frac{60}{63} \pm \frac{63}{60} = r$$

$$\frac{3}{60} = \frac{1}{20} = r \quad \text{or} \quad -\frac{123}{60} = -\frac{41}{20} = r$$

Since the interest rate cannot be negative, we need only check $\frac{1}{20}$, or 5%. 5% does check, so the interest rate was 5%.

Solve. Use a calculator and approximate answers to the nearest tenth of a percent or tenth of a second.

1. \$2000 was invested at interest rate r , compounded annually. In 2 years, it grew to \$2333. What was the interest rate? _____
2. The formula $s = 16t^2$ is used to approximate the distance s , in feet, that an object falls freely from rest in t seconds. Use the formula to find how long it would take an object to fall freely from the top of the 984 ft tall Eiffel Tower. _____
3. \$5500 was invested at interest rate r , compounded annually. In 2 years, it grew to \$6180. What was the interest rate? _____
4. Use the formula $s = 16t^2$ to find the approximate time t , that an object falls freely from rest from a height of 1325 ft. _____

EXTRA PRACTICE 32

Solving Problems Using Quadratic Equations

Use after Sections 11.1 and 11.3

5. \$7000 was invested at interest rate r , compounded annually. In 2 years, it grew to \$7836. What was the interest rate? _____

See Section 11.3 for examples of problem solving involving work and motion problems.

6. A boat travels 40 miles upstream and then turns around and travels 40 miles downstream. The total time for both trips is 6 hours. If the stream flows at 5 mph, how fast does the boat travel in still water? _____
7. It takes Jim 15 hours longer to build a wall than it does Corey. If they work together, they can build the wall in 18 hours. How long would it take Corey to build the wall alone?

8. Jose's motorcycle traveled 270 mi at a certain speed. Had he gone 15 mph faster, the trip would have taken 3 hr less. Find the speed of the motorcycle. _____
9. Gary and Marsha work together to type a short story, and it takes them 6 hr. It would take Marsha 5 hr more than Gary to type the story alone. How long would each need to type the story if they worked alone? _____
10. Karen's Honda travels 432 mi at a certain speed. If the car had gone 6 mph slower, the trip would have taken 1 hr more. Find Karen's speed. _____
11. It takes Danielle 2 hours longer to deliver the papers than it does Stan. If they work together it takes them 1 hour. How long would it take Danielle to deliver the papers alone? Round the answer to the nearest tenth of an hour. _____
12. A boat travels 16 miles upstream and then turns around and travels 16 miles downstream. The total time for both trips is 4 hours. If the stream flows at 2 mph, how fast does the boat travel in still water? Round the answer to the nearest tenth. _____