

## Writing Linear and Exponential Equations

Name Key Class Period \_\_\_\_\_

1. Determine whether each scenario can be modeled by a linear or an exponential equation.
- The price of a gallon of gas increases by \$0.75 every 2 months

Linear

- Every 2 months, a gallon of gas costs three times as much as it did before

Exponential

2. Determine whether each scenario can be modeled by a linear or an exponential equation.
- A piece of jewelry appreciates (increases in value) so that after 20 years it's worth twice what you paid for it

Linear

- A piece of jewelry appreciates so that its value doubles every 20 years

Exponential

3. Determine whether each scenario can be modeled by a linear or an exponential equation.
- A town's population declines by 3% each year

Exponential

- About 200 residents leave town each year

Linear

Write an equation to help you answer the questions.

4. The NCAA Division I Basketball tournament begins each year with a certain number of teams. After each round of games, the losing teams are cut from the tournament, so that each round has half as many teams playing as the previous round. After 3 rounds 8 teams are left. How many teams started out in the tournament?

$$y = a \cdot b^x \quad 8 = a \cdot \left(\frac{1}{2}\right)^3 \quad a = 64$$

$$8 \cdot 8 = a \cdot \frac{1}{8} \cdot 8$$

64 teams

5. An insect population triples every 4 months. If the population started out with 24 insects, how many insects would be there in 16 months?

$$y = a \cdot b^x$$

$$y = 1944$$

$$y = 24(3)^4$$

1,944 insects

6. At mellow mushroom you pay \$14 dollars for a large pizza and \$1.75 for each topping. If you order a pizza with pepperoni and green pepper, how much are you going to have to pay?

$$y = mx + b$$

$$y = 1.75x + 14$$

$$y = 1.75(2) + 14$$

$$\boxed{\$17.50}$$

$$y = 17.50$$

7. Jim buys a golf membership for \$150 and it costs him \$11 each time he plays a round of golf. How much would it cost him to play 25 rounds of golf?

$$y = mx + b$$

$$y = 11x + 150$$

$$y = 11(25) + 150$$

$$\boxed{\$425}$$

$$y = 425$$

8. The population of a city doubles every 10 years. If the population today is 3,400, how many people will live in the city in 50 years?

$$y = a \cdot b^x$$

$$y = 3400(2)^5$$

$$y = 108800$$

$$\boxed{108,800 \text{ people}}$$

9. Jason is overweight and decides it's time for him to get in shape and get a spring break body. At the start of his diet Jason weighs 397 lbs. On his diet plan he is supposed to lose 10 lbs. a week. How much weight will he lose in 12 weeks?

$$y = mx + b$$

$$y = 397 - 10x$$

$$\boxed{120 \text{ lbs}}$$

$$y = -10x + 397$$

$$y = 397 - 10(12)$$

$$y = 397 - 120$$

He would weigh  
277 lbs.

10. An adult takes 400 mg of advil. Each hour, half the amount of advil leaves the person's systems. How much advil is left in the person's system after 6 hours?

$$y = a \cdot b^x$$

$$y = 400 \left(\frac{1}{2}\right)^6$$

$$y = 6.25$$

$$\boxed{6.25 \text{ mg}}$$