

**Practice
4-4****Problem Solving**

1. Suppose you open a bank account and deposit \$10. Then, every month you deposit \$25. Write an equation that relates the total number of dollars deposited, T , and the month, m .
2. In a large city, the number of people with the flu, k , increases every day. On the first day, 9 people have the flu. Each day after the first, there are 9 times as many people who have the flu than there were the previous day. Write an equation that relates the number of people who have the flu, k , and the day, d .
3. Two cell phone companies start up at the same time. Each wants to model, or represent with an equation, the number of people, T , who have signed up for its services after m months. Company A models its number of people using $T = 25 + 20m$. Company B models its number of people using $T = 2^m$. If the models are accurate, which company had more customers after 14 months?
4. Jenice has \$2,000. Each week she pays \$25 for gas, \$30 for food, and \$60 for entertainment.
 - a) Which equation below relates the total number of dollars, T , and the week, w ?

<input type="radio"/> A. $T = 2,000 - 115w$	<input type="radio"/> C. $T = 2,000 + 115w$
<input type="radio"/> B. $T = 2,000$	<input type="radio"/> D. $T = 2,000 - 25w - 30w$
 - b) After how many weeks will there be no money left? Explain how you found your answer.
5. Each year, a cell phone carrier has 18 times as many customers as it had the previous year. The company started with 1 customer. The company incorrectly models its customers, c , using the equation $c = 18y$, where y is the number of years since the company started.
 - a) Which of these equations relates the number of customers, c , and the number of years, y ?

<input type="radio"/> A. $c = y \div 2$	<input type="radio"/> C. $c = 18 + y$
<input type="radio"/> B. $c = y^2$	<input type="radio"/> D. $c = 18^y$
 - b) Which of the following was the company's likely error?

<input type="radio"/> A. The company multiplied 18 by y instead of dividing y by 18.
<input type="radio"/> B. The company multiplied 18 by y instead of using 18^y .
<input type="radio"/> C. The company multiplied 18 by y instead of adding 18 and y .
<input type="radio"/> D. The company multiplied 18 by y instead of using y^{18} .

6. The cost, c , for your company to ship a package is related to the package weight, p , in pounds. Last year, there was a flat rate of \$3 and an additional rate of \$5 per pound. The additional rate increases by \$1 per pound this year. Write an equation that relates the cost, c , to ship a package this year and the weight of the package, p .
7. In dollars, it costs a company $59n + 1,598$ to make n items of Product A. It costs the company $51n + 1,898$ to make n items of Product B.
- a) Estimate the costs of 399 items of each product.
- b) For which product is the cost of 399 items less?
- ☐ A. Product B ☐ B. Product A
8. You are deciding between two hotels. Hotel A charges $90n$ dollars for n nights. This rate includes breakfast for each morning of your stay. Hotel B charges $80n$ dollars for n nights, but does not include breakfast. To include breakfast at Hotel B, the cost is $80n + 60$. If you want breakfast each day of your stay, which hotel has the better deal for 2 nights? For 10 nights?
9. There are 5 inches of snow on a major road. It will continue to snow at a rate of 3 inches per hour for the next n hours. The town can remove the snow at a rate of 2 inches per hour.
- a) Write an equation that relates the total amount of snow on the road, T , and the number of hours, n .
- b) If the snow keeps falling at a rate of 3 inches per hour, how much snow will there be on the road in 8 hours?
10. **Challenge** A sample contains 100 bacteria. This type of bacteria quadruples every hour.
- a) Choose the equation that relates the number of bacteria, b , and the number of hours, n .
- ☐ A. $b = 100 + 4^n$ ☐ D. $b = 100^n$
☐ B. $b = 4 + 100^n$ ☐ E. $b = 100 \cdot 4^n$
☐ C. $b = 4 \cdot 100^n$
- b) How many bacteria will there be after 5 hours?
11. **Challenge** Company A starts with 1 customer. It estimates that it will triple its number of customers each year. Company B starts with 2 customers. It estimates that its number of customers will double each year.
- a) Which company has more customers after 4 years?
- ☐ A. Company A ☐ B. Company B
- b) Will the company with fewer customers after 4 years ever have more customers than the other?
- ☐ A. No ☐ B. Yes

