Name _____ Class _____ Date _____

Practice 4-1

Using Two Variables to Represent a Relationship

1. A pet shop has 1,204 animals for sale. The animals are either mammals or reptiles. Check the two unknown quantities in this situation that are related.
   - ❑ A. the number of reptiles
   - ❑ B. the number of mammals
   - ❑ C. the number of pet owners
   - ❑ D. the number of animals for sale

2. A college student washes cars to cover his weekly expenses. The student charges $8 for each hour he spends washing cars. Check the two unknown quantities in this situation that are related.
   - ❑ A. the amount of money the student earns
   - ❑ B. the number of hours the student spends washing cars
   - ❑ C. the number of college students washing cars
   - ❑ D. the number of cars the student washes

3. An athlete plans to exercise for 90 minutes. She will only sprint and swim.

   Let x be the number of minutes the athlete spends sprinting. Let y be the number of minutes swimming. Which equation represents this situation?
   - ◯ A. $x + y = 90$
   - ◯ B. $x - y = 90$
   - ◯ C. $90 + y = x$
   - ◯ D. $90 + x = y$

4. An athlete plans to exercise for 120 minutes. He will only sprint and swim.

   Let x be the number of minutes the athlete spends sprinting. Let y be the number of minutes swimming. Check the three equations that represent this situation.
   - ❑ A. $120 - x = y$
   - ❑ B. $120 - y = x$
   - ❑ C. $x - y = 120$
   - ❑ D. $120 + y = x$
   - ❑ E. $x + y = 120$
   - ❑ F. $120 + x = y$

5. Identify the independent variable in this relationship.

   A garden hose produces g gallons of water after running for m minutes.

6. Identify the dependent variable in this relationship.

   A garden hose runs for m minutes and produces g gallons of water.

7. **Writing** Last season, a farmer harvested 18 bushels of apples and plums from her orchard.
   - **a)** What are the unknown and related quantities in this relationship?
   - **b)** Describe how you could use values for one of these unknown quantities to find values for the other. Make a table of values to illustrate your description.

8. **Reasoning** Some of the vehicles in a parking lot are two-door cars. The rest are four-door cars. There are 25 two-door cars. Let n be the number of four-door cars in the parking lot. Let T be the total number of cars in the parking lot.

a) Check the three equations that represent this situation.

❑ A. $n + 25 = T$ ❑ D. $n - 25 = T$

❑ B. $T + n = 25$ ❑ E. $T - 25 = n$

❑ C. $T + 25 = n$ ❑ F. $T - n = 25$

b) Present at least one other way to show each of these three equations. Is one way better than the others? Explain.

9. **Error Analysis** You spend c dollars for p identical pairs of pants. A friend claims that since c increases if you increase p, and p increases if you increase c, either c or p could be the independent variable.

a) Which is the independent variable?

○ A. c ○ B. p

b) Why is your friend incorrect?

○ A. Decreasing the amount you spend forces the number of pairs of pants you buy to increase. Buying more pairs of pants does not necessarily relate to the amount you spend.

○ B. Buying more pairs of pants forces the amount you spend to increase. Increasing the amount you spend does not necessarily relate to how many pairs of pants you buy.

○ C. Increasing the amount you spend forces the number of pairs of pants you buy to increase. Buying more pairs of pants does not necessarily relate to the amount you spend.

○ D. Buying fewer pairs of pants forces the amount you spend to increase. Increasing the amount you spend does not necessarily relate to how many pairs of pants you buy.

10. **Cosmetic Sales** Bintu sells skin lotion. The lotion comes in small or large bottles. The small bottle sells for $4. The large bottle sells for $15. Bintu sells 7 bottles of lotion. Write an equation to represent the total number of bottles Bintu sells. Let S be the number of small bottles Bintu sells. Let L be the number of large bottles.

11. **Multiple Representations** A woman owns stock in two companies, company A and company B. She owns 85 shares of stock in company A. Each share of stock in company A is worth $10. Each share of stock in company B is worth $15. Let b be the number of shares of stock in company B the woman owns. Let T be the total number of shares of stock the woman owns.

a) Write three equations to represent the total number of shares of stock the woman owns.

b) Present at least one other way to show each of these three equations.

12. **Open-Ended** A man spends $651 to plant 144 flowers in his garden. He plants only red flowers and yellow flowers. The red flowers cost $4 each. The yellow flowers cost $5 each. Let r be the number of red flowers the man plants. Let y be the number of yellow flowers the man plants.

   a) Write an equation for the total number of flowers.

   b) Suppose the man wants to plant three colors of flowers in the garden next year. Write an equation for the total number of flowers for this situation. Be sure to define any variables you use.

13. A local store sells cartons of eggs. The number of eggs in a carton and the cost of the carton of eggs are related. You need 9 eggs. What is the independent variable?

14. **Challenge** A donation jar holds 18 one-dollar bills, some five-dollar bills, and some fifty-dollar bills. There are 27 bills in the jar. Let x be the number of five-dollar bills in the jar. Let y be the number of fifty-dollar bills.

   a) Check the three equations that represent the situation.

   ❑ A. $x + y + 27 + 18$ ❑ E. $18 + x + y = 73$

   ❑ B. $x = 73 - 18 - y$ ❑ F. $y = 73 - 18 - x$

   ❑ C. $x + y = 73 + 18$ ❑ G. $y = 27 - 18 - x$

   ❑ D. $x = 27 - 18 - y$ ❑ H. $18 + x + y = 27$

   b) If there are 4 five-dollar bills in the jar, how many fifty-dollar bills are in the jar?

15. **Challenge** The weight of a stack of dishes and the number of dishes in the stack are related.

   a) What is the dependent variable?

   ○ A. the number of dishes in the stack   ○ C. the number of stacks of dishes

   ○ B. the weight of each dish   ○ D. the weight of the stack

   b) Describe why the other variable is considered to be independent in this situation.