**Direct Variation Worksheet**

1. Which equation is *not* an example of a direct variation?
   A. \( y = \frac{-7}{3} x + 1 \)  
   B. \( y = \frac{5}{16} x \)  
   C. \( y = 4x \)  
   D. \( y = -9x \)

2. Which equation is *not* an example of a direct variation?
   A. \( y = x \)  
   B. \( 2x + 3y = 0 \)  
   C. \( y = \frac{1}{2} x \)  
   D. \( 5x + 6y = 30 \)

Name the constant of variations (k) for each equation.

3. \( y = 5x \)

4. \( y = \frac{1}{2} x \)

5. \( y = \frac{-2}{3} x \)

Write a direct variation equation that relates the two variables. Then solve.

6. Suppose \( y \) varies directly as \( x \), and \( y = 16 \) when \( x = 8 \). Find \( y \) when \( x = 16 \).

7. Suppose \( y \) varies directly as \( x \), and \( y = 21 \) when \( x = 3 \). Find \( x \) when \( y = 42 \).

8. Suppose \( v \) varies directly as \( g \), and \( v = 36 \) when \( g = 4 \). Find \( v \) when \( g = 11 \).

9. Suppose \( a \) varies directly as \( b \), and \( a = 7 \) when \( b = 2 \). Find \( b \) when \( a = 21 \).

10. Suppose \( y \) varies directly as \( x \), and \( y = 9 \) when \( x = 3/2 \). Find \( y \) when \( x = 1 \).
11. Does the following graph represent a direct variation?

12. Does the following graph represent a direct variation?

Direct Variation Word Problems

**Example:** A local fast food restaurant takes in $9000 in a 4 hour period. Write a direct variation equation for the relationship between income and number of hours. Estimate how many hours it would take the restaurant to earn $20,250.

a. Write a direct variation equation for the income in any number of hours.

**Step 1:** Assign variables: Let $i =$ income and $h =$ hours

**Step 2:** Determine the constant of variation

Formula: $\frac{y}{x} = k \text{ or } \frac{i}{h} = k$

\[
\frac{9000}{4} = k
\]

$k = 2250 \text{ (constant of variation)}$

**Step 3:** Write the direct variation equation

Formula: $y = kx$ or $i = kh$

$i = 2250h \text{ (direct variation equation)}$

b. Estimate how many hours it would take the restaurant to earn $20,250.

$i = 2250h \text{ (direct variation equation)}$

\[
\frac{20250}{2250} = h
\]

$h = 9 \text{ (at this rate, it will take 9 hours for the restaurant to earn$20,250)}$
13. Your distance from lightning varies directly with the time it takes you to hear thunder. If you hear thunder 10 seconds after you see the lightning, you are about 2 miles from the lightning.

   a. Write a direct variation equation for the relationship between time and distance.

   b. Estimate how many seconds it would take for the thunder to travel a distance of 4 miles.

14. A recipe for 2 dozen corn muffins calls for 3 cup of flour. The number of muffins varies directly with the amount of flour you use.

   a. Write a direct variation equation for the relationship between the number of cups of flour and the number of muffins.

   b. Estimate how many cups of flour are needed to make 6 dozen muffins.