1. Which relation is a function? Explain why.
   A.  \[
   \begin{array}{c}
   6 & 18 \\
   12 & 36 \\
   18 & 54 \\
   \end{array}
   \]

   B.  \[
   \begin{array}{c}
   -3 & 1 \\
   -1 & 9 \\
   1 & \\
   3 & 9 \\
   \end{array}
   \]

   C.  \[
   \begin{array}{c}
   0 & 12 \\
   4 & 15 \\
   8 & \\
   \end{array}
   \]

   D.  \[
   \begin{array}{c}
   1 & 32 \\
   2 & 48 \\
   3 & 64 \\
   \end{array}
   \]

2. Which relation is a function? Explain why.
   A.  \{ (1, 3), (2, 2), (3, 3), (3, 4) \}
   B.  \{ (10, 15), (20, 40), (20, 45), (30, 50) \}
   C.  \{ (12, 28), (14, 28), (16, 30), (18, 32) \}
   D.  \{ (22, 11), (24, 12), (26, 12), (26, 13) \}

3. Which relation is a function?
   A.  \{ (-1, 1), (2, 8), (-1, -1), (-2, -8) \}
   B.  \{ (1, 2), (2, 8), (3, 18), (2, 32) \}
   C.  \{ (-3, 9), (-2, 4), (2, 4), (3, 9) \}
   D.  \{ (1, 5), (2, 10), (-2, 10), (1, 15) \}

4. Which relation is NOT a function? Explain why.
   A.  \{ (\frac{1}{2}, \frac{1}{3}), (\frac{1}{4}, \frac{1}{5}), (\frac{1}{6}, \frac{1}{7}), (\frac{1}{8}, \frac{1}{9}) \}
   B.  \{ (\frac{1}{2}, \frac{2}{3}), (\frac{1}{3}, \frac{3}{2}), (\frac{2}{3}, \frac{2}{3}), (\frac{3}{3}, \frac{4}{3}) \}
   C.  \{ (\frac{1}{2}, \frac{1}{3}), (\frac{2}{3}, \frac{1}{6}), (\frac{4}{3}, \frac{1}{7}), (\frac{5}{2}, \frac{1}{8}) \}
   D.  \{ (\frac{1}{2}, \frac{1}{4}), (\frac{1}{4}, \frac{1}{8}), (\frac{4}{8}, \frac{1}{16}), (\frac{4}{16}, \frac{1}{32}) \}

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**Review It!**

- **Relation**: A set of ordered pairs
- **Function**: A relation in which each first value is paired with one and only one second value

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When you work with relations and functions, remember:

- **Vertical Line Test**: A test for functions, a vertical line crosses only one point on the graph.
- **Ordered Pair**: A pair of numbers that can be graphed as a point on a coordinate plane.
5. Which set of ordered pairs is NOT a function? Explain why.
   A. \{ (6, 8), (3, 4), (3, -4), (6, -8) \}
   B. \{ (3, -2), (1, -2), (0, -2), (2, -2) \}
   C. \{ (5, 25), (6, 36), (-5, 25), (-6, 36) \}
   D. \{ (-4, 8), (-2, 4), (2, 4), (4, 8) \}

6. Which graph below does NOT show a function? Explain why.
   A.
   
   B.
   
   C.
   
   D.
Lesson Practice

1. Which relation is a function? Explain why.
   A. \[ \{(6, 18), (12, 36), (18, 54)\} \]
   B. \[ \{(-3, 9), (-1, 1), (1, 1), (3, 9)\} \]
   C. \[ \{(0, 12), (4, 15)\} \]
   D. \[ \{(1, 32), (2, 48), (3, 64)\} \]

2. Which relation is a function? Explain why.
   A. \[ \{(1, 3), (2, 2), (3, 3), (4, 4)\} \]
   B. \[ \{(10, 15), (20, 40), (20, 45), (30, 50)\} \]
   C. \[ \{(12, 28), (14, 28), (16, 30), (18, 32)\} \]
   D. \[ \{(22, 11), (24, 12), (26, 12), (26, 13)\} \]

3. Which relation is a function?
   A. \[ \{(-1, 1), (2, 8), (-1, -1), (-2, -8)\} \]
   B. \[ \{(1, 2), (2, 8), (3, 18), (2, 32)\} \]
   C. \[ \{(-3, 9), (-2, 4), (2, 4), (3, 9)\} \]
   D. \[ \{(1, 5), (2, 10), (-2, 10), (1, 15)\} \]

4. Which relation is NOT a function? Explain why.
   A. \[ \{\left(\frac{1}{2}, \frac{3}{2}\right), \left(\frac{1}{4}, \frac{1}{5}\right), \left(\frac{1}{6}, \frac{1}{7}\right), \left(\frac{1}{8}, \frac{1}{9}\right)\} \]
   B. \[ \{\left(\frac{1}{2}, \frac{3}{2}\right), \left(\frac{1}{3}, \frac{1}{2}\right), \left(\frac{2}{3}, \frac{1}{3}\right), \left(\frac{3}{3}, \frac{4}{3}\right)\} \]
   C. \[ \{\left(\frac{1}{2}, \frac{5}{2}\right), \left(\frac{1}{2}, \frac{1}{6}\right), \left(\frac{4}{2}, \frac{1}{7}\right), \left(\frac{5}{2}, \frac{1}{8}\right)\} \]
   D. \[ \{\left(\frac{1}{2}, \frac{1}{4}\right), \left(\frac{1}{4}, \frac{1}{8}\right), \left(\frac{4}{16}, \frac{1}{32}\right)\} \]

The x-value \(\frac{1}{2}\), has more than 1 y-value.

- **Review**
  - a set of ordered pairs
  - a relation in which each first value is paired with one and only one second value

- **Function**
  - a relation which is a function and has 1 y-value.

- **Relation**
  - a set of ordered pairs

- **Vertical line test**
  - a test for functions: a vertical line crosses only one point on the graph.
5. Which set of ordered pairs is NOT a function? Explain WHY.
   A. \{(6, 8), (3, 4), (3, -4), (6, -8)\}
   B. \{(3, -2), (1, -2), (0, -2), (2, -2)\}
   C. \{(5, 25), (6, 36), (-5, 25), (-6, 36)\}
   D. \{(-4, 8), (-2, 4), (2, 4), (4, 4)\}

6. Which graph below does NOT show a function? Explain WHY.
   A. 
   B. 
   C. 
   D. 

   The x-value 3, has 2 y-values, which are 4 and -4.
   does not pass the vertical line test. Vertical line touches more than 2.