FINDING AND USING UNIT RATES

For questions 1-8 write two unit rates for each situation. Then circle the one that seems to make the most sense.

1. travel 250 miles in 5 hours
   \[ \frac{50 \text{ mi}}{1 \text{ h}} \]

2. Earn $75.20 in 8 hours
   \[ \frac{9.4 \text{ h}}{1 \text{ h}} \]

3. read 80 pages in 2 hours
   \[ \frac{40 \text{ p}}{1 \text{ h}} \]

4. Type 8,580 words in 165 minutes
   \[ \frac{52 \text{ w}}{1 \text{ m}} \]

5. manufacture 2,488 parts in 8 hours
   \[ \frac{311 \text{ p}}{1 \text{ h}} \]

6. 50 copies of a book on 2 shelves
   \[ \frac{256}{1 \text{ s}} \]

7. $30 for 6 books
   \[ \frac{5d}{1 \text{ b}} \]

8. 24 points in 3 games
   \[ \frac{8p}{1 \text{ g}} \]

For questions 9-14 find each unit price, then circle the better buy.

9. paper: 100 sheets for $0.99
   \[ \frac{100 \text{ s}}{\$0.99} \]
   \[ \frac{500 \text{ s}}{\$4.29} \]

10. peanuts: 1 pound for $1.29
    \[ \frac{1 \text{ lb}}{\$1.29} \]
    \[ \frac{0.75 \text{ lb}}{\$0.95} \]
11. crackers: \(15\text{ ounces for } $1.79\)  
\(12\text{ ounces for } $1.49\)

\[
\frac{15\text{ oz}}{11.79} \rightarrow \frac{1\text{ oz}}{0.79} \quad \frac{12\text{ oz}}{11.49} \rightarrow \frac{1\text{ oz}}{0.96}
\]

13. pencils: 4 for $1.25  
\(25\text{ for } $5.69\)

\[
\frac{4\text{ p}}{1.25} \rightarrow \frac{1\text{ p}}{0.3125} \quad \frac{25\text{ p}}{5.69} \rightarrow \frac{1\text{ p}}{0.2276}
\]

12. apples: 3 pounds for $1.89  
\(6\text{ pounds for } $2.49\)

\[
\frac{3\text{ lb}}{1.89} \rightarrow \frac{1\text{ lb}}{0.63} \quad \frac{5\text{ lb}}{2.49} \rightarrow \frac{1\text{ lb}}{0.498} \quad \frac{6\text{ lb}}{2.39} \rightarrow \frac{1\text{ lb}}{0.23167}
\]

15. During the breaststroke competitions of a recent Olympics, Nelson Diebel swam 100 meters in 62 seconds, and Mike Bowerman swam 200 meters in 130 seconds. Who swam at a faster rate? \(\text{Nelson}\)

\[
\frac{100\text{ m}}{62\text{ s}} = \frac{X_\text{m}}{1\text{ s}}
\]

\[
62X = 100 \quad X = 1.613 \text{ mps}
\]

16. During a vacation, the Vasquez family traveled 174 miles in 3 hours on Monday, and 290 miles in 5 hours on Tuesday. What speed were they traveling on Monday? What speed were they traveling on Tuesday?

Monday

\[
\frac{174\text{ m}}{3\text{ h}} = \frac{X_\text{m}}{1\text{ h}}
\]

\[
X = 58 \quad \text{speed: 58 mph}
\]

Tuesday

\[
\frac{290\text{ m}}{5\text{ h}} = \frac{X_\text{m}}{1\text{ h}}
\]

\[
X = 58 \quad \text{speed: 58 mph}
\]
17. The graph to the right models the relationship between the time (x), in hours, Janet works and the amount of money (y), in dollars, she earns.

Which statement explains how she knows this relationship is proportionally related?

A. The graph is a straight line with positive slope
B. The graph is a straight line going through (0,0)
C. The graph is a straight line passing through (1,12.5)
D. The graph is a straight line with no negative values

18. Which graph shows a proportional relationship with a unit rate of 3/2?
19. The table below shows the relationship between the number of water bottles at a park that are thrown away and the number that are recycled for each of 5 months.

<table>
<thead>
<tr>
<th>Month</th>
<th>Water Bottles Thrown Away</th>
<th>Water Bottles Recycled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>80</td>
<td>24</td>
</tr>
<tr>
<td>4</td>
<td>110</td>
<td>33</td>
</tr>
<tr>
<td>5</td>
<td>140</td>
<td>42</td>
</tr>
</tbody>
</table>

Which statement correctly describes the relationship between the number of water bottles that are thrown away and the number that are recycled each month?

A. The relationship is proportional. For every 3 bottles thrown away, 10 are recycled
B. The relationship is proportional. For every 10 bottles thrown away, 3 are recycled
C. The relationship is not proportional. The number thrown away increases more from month to month than the number recycled.
D. The relationship is not proportional. The difference between the number recycled and thrown away changes each month.

20. A concert hall sells tickets in three different price ranges. For each price range there are both adult and child rates. The table to the right has this data.

<table>
<thead>
<tr>
<th>Adult Tickets</th>
<th>Child Tickets</th>
</tr>
</thead>
<tbody>
<tr>
<td>$82.00</td>
<td>$20.50</td>
</tr>
<tr>
<td>$56.00</td>
<td>$14.00</td>
</tr>
<tr>
<td>$36.00</td>
<td>$9.00</td>
</tr>
</tbody>
</table>

Which statement best describes the relationship between adult ticket prices (a) and child ticket prices (c)?

A. It is proportional and can be represented by c = (1/4)a
B. It is proportional and can be represented by c = 4a
C. It is not proportional because the change in a is not constant
D. It is not proportional because the change in c is not constant
21. Use the graph to the right.

a. What does the point (1, 20) mean in this situation? How about the point (0, 0)?
   (1, 20) -> traveling 20 km in 1 hour
   (0, 0) -> traveling 0 km in 0 hours

b. What is the Constant of Proportionality for this particular situation? How do you know?
   \[ \text{20} \] is the unit rate, which is \( \frac{20}{1} \) km/h.

22. Mr. Dutelle buys dog treats at PetSmart for Dwight. It's a great way to spend a Friday night. The table below shows the cost, C, and the number of treats, N.

<table>
<thead>
<tr>
<th>Treats (N)</th>
<th>15</th>
<th>1.6 ( \frac{5}{3} )</th>
<th>1</th>
<th>20</th>
<th>11</th>
<th>42</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost (C)</td>
<td>$9</td>
<td>$1.6 ( \frac{5}{3} )</td>
<td>$0.6</td>
<td>$12</td>
<td>$6.6</td>
<td>$25.20</td>
</tr>
</tbody>
</table>

a. Complete the table.

b. How many treats can you buy for $6?\[ 10 \text{ treats} \] \( \frac{6}{0.6} = 10 \)

c. How much do 30 treats cost? \[ \$18 \] \( \frac{30 \text{ treats} \times 0.6 \text{ per treat}}{1 \text{ treat}} = \$18 \)

d. Identify two unit rates from the table. \[ \frac{1.6 \times \frac{5}{3} \text{ treats}}{\$1} = \$1.6 \text{ per treat} \]

e. Write an equation from this information.
   \[ \begin{align*}
   &\text{1) } C = 0.6N \quad \text{or} \quad C = \frac{3}{5}N \\
   &\text{2) } N = \frac{5}{3}C
   \end{align*} \]

f. Is this a proportional relationship? Explain why or why not.
   Yes 1) you can scale the table, there exists a C.O.P
   2) \( (0,0) \) works in both equations.