1) In Katya’s car, the number of miles driven is proportional to the number of gallons of gas used.

<table>
<thead>
<tr>
<th>Number of Gallons</th>
<th>Number of Miles Driven</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>60</td>
</tr>
<tr>
<td>5</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>270</td>
</tr>
<tr>
<td>12</td>
<td>360</td>
</tr>
</tbody>
</table>

a. Find the missing value in the table.

b. Write an equation that will relate the number of miles driven to the number of gallons of gas.

c. What is the constant of proportionality?

d. How many miles could Katya go if she filled her 22-gallon tank?

e. If Katya takes a trip of 600 miles, how many gallons of gas would be needed to make the trip?
2) Amber works at an ice cream shop. The hours worked and wages earned are shown in the graph.

![Amber's Wages Graph]

a) Identify the constant of proportionality and explain what it means in the context of the situation.

b) Write an equation for Amber that models the relationship between her wage and the time she worked.

c) How much would Amber make after working 12 hours?

d) How long will it take her to earn $60?

e) What does the point (2, 14) represent on the graph?
3) Mr. Jordan walks $\frac{3}{4}$ mi in $\frac{1}{4}$ hr.

a) What is the constant of proportionality?

b) Write an equation that will relate the distance (miles) to the time (hours).

c) At this rate, how far will he walk in $1^{1/2}$ hours?

d) At this rate, how long will it take him to walk 8 miles?
4) Mr. Jordan buys five doughnuts for $3.

a) What is the constant of proportionality?

b) Write an equation that will relate the cost to the number of doughnuts.

c) How much will 18 doughnuts cost?

d) How many doughnuts can you get for $10?
Mr. Jordan buys five doughnuts for $3.

e) Graph the relationship.

f) Explain what the point (15, 9) means in the context of the problem?

g) What is the y-coordinate (1,   )
5) An earthquake travels through 45 km of rock in 25 seconds. Which equation represents the relationship between \( t \), the number of seconds, and \( d \), the total distance the wave travels?

a) \( d = \frac{5}{9}t \)

b) \( d = 70t \)

c) \( d = 1 \frac{4}{9}t \)

d) \( d = 1.8t \)

6) The amount Troy charges to mow a lawn is proportional to the time it takes him to mow the lawn. Troy charges $36 to mow a lawn that took him 1.5 hours to mow. Which equation models the amount in dollars, \( d \), Troy charges when it takes him \( h \) hours to mow a lawn?

a) \( d = 54h \)  
b) \( h = 54d \)  
c) \( d = 24h \)  
d) \( h = 24d \)

7) Jonah has a recipe that uses \( \frac{1}{2} \) cups of brown sugar and \( \frac{2}{3} \) cups of flour to make 20 muffins. He has a total of 5 cups of flour.

a) Exactly how many cups of brown sugar will Jonah use if he uses all 5 cups of flour?

b) Exactly how many muffins will Jonah make if he uses all 5 cups of flour?
8) Select the company that has the greatest hourly pay rate.

a) Company A

<table>
<thead>
<tr>
<th>Time, h (hours)</th>
<th>Earnings, E (dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>27</td>
</tr>
<tr>
<td>5</td>
<td>45</td>
</tr>
</tbody>
</table>

b) Company B calculates the earnings of an employee, E, for working h hours using the equation \( E = 9.25h \).

c) Company C pays an employee $59.50 for working 7 hours.

d) Company D

9) Complete the table (0.5 pts each)

<table>
<thead>
<tr>
<th>Distance Run (miles)</th>
<th>Distance Biked (miles)</th>
<th>Total Amount of Exercise (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>
| \(
\begin{align*}
3 & \quad \frac{1}{2} \\
5 & \quad \frac{1}{2} \\
2 & \quad \frac{1}{8} \\
3 & \quad \frac{1}{3}
\end{align*}
\) | 7 | 5 |
10) What is the only situation in which you may cross multiplication? (4 points)
_______________________________________________________________________________________
_______________________________________________________________________________________

Answer Key

1) Table: 9  
   a. \( m = 30g \) [M=miles; G=gallons] OR \( y = 30x \) [y=miles; x=gallons]
   b. \( \frac{30 \text{ mi}}{1 \text{ gal}} \)
   c. 660 miles
   d. 20 gallons

2) –  
   a. \( \frac{$7}{1 \text{ hr}} \)
   b. \( w = 7h \) [w=wages; h=hours] OR \( y = 7x \) [y=wages; x=hours]
   c. $84
   d. \( \frac{60}{7} \) hours OR \( 8\\frac{4}{7} \) hours OR \( \approx 8.57 \) hours
   e. When Amber works 2 hours, she earns $14.

3) –  
   a. \( \frac{3 \text{ mi}}{1 \text{ hr}} \)
   b. \( d = 3t \) [d=distance (miles); t=time (hours)]
   c. \( 4\frac{1}{2} \) miles
   d. \( 2\frac{2}{3} \) hours

4) –  
   a. \( \frac{$\frac{3}{5}}{1 \text{ donut}} \) or \( \frac{$0.60}{1 \text{ donut}} \)
   b. \( c = \frac{3}{5}d \) OR \( c = 0.6d \) [c=cost; d=donuts]
   c. \( \frac{54}{5} = 10 \frac{4}{5} = 10.80 \)
   d. \( 16\frac{2}{3} = 16.\bar{6} \rightarrow 16 \) is the practical answer.
   e. –
   f. 15 donuts cost $9
   g. \( (1, 0.6) \) or \( (1, \frac{3}{5}) \)

5) D
6) C

7)  
   a. \( \frac{4\frac{1}{2}}{2} \) cups
   b. 60 muffins

8) B

9) In order: \( 4, 8, 10\frac{1}{2}, 2\frac{3}{4}, 8\frac{1}{4}, 4\frac{1}{4}, 6\frac{3}{8}, 1 \)