Graded Assignment

Semester Test, Part 2

Answer the questions below. When you are finished, submit this assignment to your teacher by the due date for full credit.

(10 points)

1. The Park Commission proposed the following rate increases for bike rentals.

<table>
<thead>
<tr>
<th>Proposed Bike Rental Rate Increase</th>
<th>Current Rate</th>
<th>Increased Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Charge</td>
<td>$6</td>
<td>$10</td>
</tr>
<tr>
<td>Hourly Rate</td>
<td>$4</td>
<td>$5</td>
</tr>
</tbody>
</table>

a. Write a variable expression showing the total cost to rent a bike at the current rate. Write a variable expression showing the total cost to rent a bike at the increased rate. Define the variable.

Hours = h

6 + 4H

10 + 5H

b. Use the variable expressions to calculate the cost to rent a bike for 6 hours at the current rate and at the increased rate. Show all your work.

6 + 4 x 6 = 30  rent a bike for 6 hours at the current rate: $30

10 + 5 x 6 = 40 increased rate: $40

c. Calculate the percent increase in the total cost to rent a bike for 6 hours if the proposed rates are approved. Show all your work.

(40 – 30 / 30) x 100 = 33.33%

d. Jerome paid $42 for a bike rental at the current rate. Write and solve an equation to determine the number of hours he rented the bike. Show all your work.

6 + 4H = 40

4H = 40 – 6

4H = 34

H = 8.5

He rented the bike for 8.5 hours (8 hours, 30 mins)
(12 points)

2. Lawrence has two part-time jobs, one at a movie theater and one at a pet store. He is paid by the hour at each job. Last week, he worked 10 hours at the movie theater and 8 hours at the pet store and earned a total of $152.50. The week before, he worked 8 hours at the movie theater and 12 hours at the pet store and earned a total of $171.00.

   a. Determine how much Lawrence earns per hour at the pet store. Show all of your work.

   \[10 \text{M} + 8 \text{P} = 152.50\]
   \[8\text{m} + 12\text{p} = 171.00\]

   \[10 \text{M}(x) - 8 + 8\text{P}(x) - 8 = 152.50(x) - 8\]
   \[8\text{M}(x) + 12\text{P}(x) 10 = 171.00(x) 10\]

   \[-80\text{M} - 64\text{P} = -1220.00\]
   \[80\text{M} + 120\text{P} = 1710.00\]

   ADD:
   
   \[-80\text{M} - 64\text{P} = -1220.00\]
   \[80\text{M} + 120\text{P} = 1710.00\]

   \[\begin{align*}
   \text{56P} &= 490.00 \\
   \text{P} &= 490.00/56 \\
   \text{P} &= 8.75
   \end{align*}\]

   FILL IN P:
   \[8\text{M} + 12 \text{(x) 8.75} = 171.00\]
   \[8\text{M} + 105.00 = 171.00\]
   \[8\text{M} = 171.00 - 105.00\]
   \[8\text{M} = 66.00\]
   \[\text{M} = 8.25\]

   Lawrence earns $8.75 per hour at the pet store. He also earns $8.25 at the movie theater.
b. Next week, Lawrence wants to earn at least $168.00. He is scheduled to work 6 hours at the pet store. Write and solve an inequality to find the minimum number of hours he needs to work at the movie theater in order to earn at least $168.00. Show all of your work.

P = pay per hour = 8.75
M = pay per hour = 8.25

6P + xM (>=) 168.00

6 (x) 8.75 + X (x) 8.25 (>=) 168.00
52.50 + X (x) 8.25 (>=) 168.00
X (x) 8.25 (>=) 115.50
X (<=) 115.50/8.25
X (<=) 14

So he would have to work a total of 14 hours at the movie theater to earn at least $168.00.
3. Consider the quadratic function \( f(x) = x^2 - 2x - 3 \).

   a. Find the \( x \)-intercepts of the graph of \( f(x) \). Show all your work.

   Factor:
   
   \[ X^2 - 2x - 3 \]
   
   \( (x - 3)(x + 1) \)

   Check (FOIL):
   
   \( (x - 3)(x + 1) \)
   
   \[ x^2 + x - 3x - 3 \]
   
   \[ x^2 - 2x - 3 \]

   \( X \) intercepts:
   
   \[(x-3)(x+1)\]
   
   \( x - 3 = 0 \quad x + 1 = 0 \)
   
   \( x = 3 \quad x = -1 \)

   \( X = 3 \) and \(-1\)

   b. Find the \( y \)-intercept of the graph of \( f(x) \). Show all your work.

   \( F(x) = x^2 - 2x - 3 \)

   \( F(x) = 0^2 - 2(0) - 3 \)

   \( F(x) = -3 \)

   c. Find the coordinates of the vertex of the graph of \( f(x) \). Show all your work.

   \( V = \frac{-b}{2a} \)

   \( F(x) = x^2 - 2x - 3 \)

   \( b = -2 \)

   \( a = x \) then \( x = 1 \)

   so:

   \( -(-2) / 2 \times 1 \)

   \( 2 / 2 = 1 \)

   \( F(1) = 1^2 - 2(1) - 3 \)

   \( 1 - 2 - 3 = -4 \)

   \( \text{Vertex} = (1, -4) \)
d. Sketch the graph of \( f(x) \) on the grid. Label the vertex and the points containing the \( x \)- and \( y \)-intercepts with ordered pairs.

Answer:

X and \( y \) intercepts: (3,-3) and (-1,-3)

VERTEX: (1, -4)