Mat 011 Agenda    Day 4: 9/11/02

- Attendance
- Questions
- PowerPoint Lecture 3, S13
- PowerPoint Lecture 4, S25

Review Sheet
Distributive Property
Simplify Algebraic Expressions
Solving Equations
Rental Car Problem, S31

QUIZ #1

Homework: Topics 5, 6 pages S19, S29
Mat 011 Web page:
http://www.mc3.edu/crsprog/career/MATHSCI/mat011/mat011.htm

BlackBoard: http://blackboard.mc3.edu
Your username is: << first letter first name – full last name – last 4 digits of Datatel ID>>
Password is: <<Datatel ID>>
For Example:
Student Name: John Smith    Datatel ID: 1234567
ID: jsmith4567
Password: 1234567
Answer the following without using a calculator!

<table>
<thead>
<tr>
<th>Operation</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2 - 6</td>
<td>-8</td>
</tr>
<tr>
<td>2 - 6</td>
<td>-4</td>
</tr>
<tr>
<td>-2 + 6</td>
<td>4</td>
</tr>
<tr>
<td>2 + 6</td>
<td>8</td>
</tr>
<tr>
<td>-2 * (-6)</td>
<td>12</td>
</tr>
<tr>
<td>2 * (-6)</td>
<td>-12</td>
</tr>
<tr>
<td>( \frac{0}{7} )</td>
<td>0</td>
</tr>
<tr>
<td>( \frac{6}{0} )</td>
<td>undefined</td>
</tr>
<tr>
<td>( \frac{0}{0} )</td>
<td>indeterminate</td>
</tr>
</tbody>
</table>
For the following questions write an arithmetic expression for each sentence, then find the person’s net worth.

8. I have $30 in my checking account and I owe PECO $150. What is my net worth?

\[ +30 - 150 = -120 \]
9. I am in debt for $50 and I receive a check for $90. What is my net worth?

\[-50 + 90 = 40\]
10. I am in debt for $120 and I owe Montco $40. What is my net worth?

\[-120 - 40 = -160\]
Like Terms: Terms where the variables and their exponents are the same

Factors: Parts of an algebraic expression that are multiplied

\[-6y + 4x^2 + 9xy\]
The terms in the equation $2xy + 3z = w$ are:

$2xy$  $3z$  $w$
Factors

Factors in the term $2xy$ are:

$$2 \quad x \quad y$$

Factors in the term $3z$ are:

$$3 \quad z$$
Combine Like Terms:

$3x + 7 + 2x + 5$

$5x + 12$
Distributive Property:

\[2(3x + 5)\]

\[6x + 10\]
Worksheet

\[ x + 3xy + 2x = 3x + 3xy \]

\[ x^2 + 7x - 2x^2 + 8 = 2x^2 + 7x + 8 \]

\[-16ab\]

\[(x + 2) + 7x = 1x + 2 + 7x = 8x + 2 \]
\[
\frac{a + 2bc - 3e + 4bc - 4a}{-3a + 6bc - 3c}
\]

\[3(x+2) = 3x + 6\]

\[5(x-3) = 5x - 15\]

\[-7(2x+3) = -14x - 21\]

\[4(x-2) = 4x - 8\]
\[
\frac{3x}{2y} = \frac{3x}{2z}
\]

\[
\frac{12}{24} = \frac{2.6}{4.6} = \frac{2}{4} \cdot \frac{1.6}{2.6} = \frac{1.6}{2.6}
\]
\[
\frac{8abc}{4a} = \frac{2b}{1} = 2b
\]

\[
\frac{\frac{2x}{4x}}{\frac{6x}{3y^2}} = \frac{2}{3y^2}
\]
\[
\frac{x}{10a}b-c
\]
\[
\frac{1}{10b-c}
\]
\[
\frac{10}{10} = 10
\]
The manager of an Ice Cream Shop pays $800 per month for fixed expenses such as rent, light, and wages. Ice cream cones are sold for $1.85 each, of which $1.40 goes for ice cream, cone and napkin.

Calculate the monthly profits, when they have sold the following number of ice cream cones per month?

<table>
<thead>
<tr>
<th>Cones</th>
<th>Calculations</th>
<th>Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>10,000</td>
<td>[0.45(10000) - 800]</td>
<td>$3,700</td>
</tr>
<tr>
<td>15,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Let \( c \) = \# Cones, \( P = 0.45c - 800 \), \( P = \) Profit
Equation for Profit for Ice Cream Cones

\[
\begin{array}{c}
2.10 \\
-1.40 \\
\hline
0.70
\end{array}
\]

Suppose the expenses increase to $875 a month and they charge $2.10 a cone ($1.40 still goes for ice cream, cone and napkin). What will be the new equation for their monthly profits?

Let \( C \) = \# Cones
\[
p = \text{monthly profit}
\]
\[
p = 0.70C - 875
\]
Wrecker charges $21.95 per day plus .41 a mile.

Complete the table.

<table>
<thead>
<tr>
<th>MILES</th>
<th>CALCULATION</th>
<th>COST ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>.41(10) + 21.95</td>
<td>26.05</td>
</tr>
<tr>
<td>20</td>
<td>.41(20) + 21.95</td>
<td>30.15</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>m</td>
<td>.41m + 21.95</td>
<td></td>
</tr>
</tbody>
</table>

\[ C_w = .41m + 21.95 \]
Equation for Rental Car

A rental car company charges $21.95 per day plus 41 cents a mile.
Another rental company, Limo, charges a flat rate of $39.95 a day with unlimited miles. How many miles would you have to drive to make Limo cost the same as Wrecker?

<table>
<thead>
<tr>
<th>Miles</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>39.95</td>
</tr>
<tr>
<td>20</td>
<td>39.95</td>
</tr>
<tr>
<td>30</td>
<td>39.95</td>
</tr>
</tbody>
</table>

\[ C_L = 39.95 \]
Another rental company, Limo, charges a flat rate of $39.95 a day with unlimited miles. How many miles would you have to drive to make Limo cost the same as Wrecker?

<table>
<thead>
<tr>
<th>MILES</th>
<th>CALCULATION</th>
<th>Wrecker COST ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>.41 ( \times 10 ) + 21.95</td>
<td>26.05</td>
</tr>
<tr>
<td>20</td>
<td>.41 ( \times 20 ) + 21.95</td>
<td>30.15</td>
</tr>
<tr>
<td>30</td>
<td>.41 ( \times 30 ) + 21.95</td>
<td>34.25</td>
</tr>
<tr>
<td>40</td>
<td>.41 ( \times 40 ) + 21.95</td>
<td>38.35</td>
</tr>
<tr>
<td>44</td>
<td>.41 ( \times 44 ) + 21.95</td>
<td>39.99</td>
</tr>
<tr>
<td>( m )</td>
<td>.41 ( \times m ) + 21.95</td>
<td>C</td>
</tr>
</tbody>
</table>
Equation for Rental Car

A third company, Ertz, charges $18.95 a day and .50 a mile. What is the formula that calculates the cost of renting a car from Ertz for a day?

\[ C_e = .50m + 18.95 \]
A third company, Ertz, charges $18.95 a day and .50 a mile. What is the formula that calculates the cost of renting a car from Ertz for a day? How many miles would you have to drive to make Ertz cost the same as Wrecker?
A third company, Ertz, charges $18.95 a day and $.50 a mile. What is the formula that calculates the cost of renting a car from Ertz for a day? How many miles would you have to drive to make Ertz cost the same as Wrecker?

To solve this problem algebraically, set the cost of Ertz equal to the cost of Wrecker.
Objectives

- To learn the procedure for solving equations
- To distinguish between $x + 2 = 8$ versus $2x = 8$
- To take a problem situation and solve the algebraic equation
Objectives

• To learn the procedure for solving equations
• To distinguish between $x + 2 = 8$ versus $2x = 8$
• To take a problem situation and solve the algebraic equation
Solve the Equation: \( x - 5 = -2 \)
Solve the Equation: \( x - 5 = -2 \)

What operation is between \( x \) and 5?  
Do the opposite!
Solve the Equation: \( x - 5 = -2 \)

What operation is between \( x \) and 5? Do the opposite!

\[
x - 5 + 5 = -2 + 5
\]

\[
x = 3
\]
Solve the Equation: \(-3x = 15\)
Solve: $2x - 8 = 5x + 4$
Distinguish between
\[ x + 2 = 8 \] versus \[ 2x = 8 \]
• \( x + 2 = 8 \)
• What operation joins 2 to \( x \)?
• Perform the opposite operation, subtraction
• \( x + 2 - 2 = 8 - 2 \)
• \( x = 6 \)
Distinguish between
\[ x + 2 = 8 \text{ versus } 2x = 8 \]

<table>
<thead>
<tr>
<th>Equation</th>
<th>Step 1</th>
<th>Step 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>( x + 2 = 8 )</td>
<td>What operation joins 2 to ( x )?</td>
<td>Perform the opposite operation, subtraction</td>
</tr>
<tr>
<td>( 2x = 8 )</td>
<td>What operation joins 2 to ( x )?</td>
<td>Perform the opposite operation, division</td>
</tr>
<tr>
<td>( x + 2 - 2 = 8 - 2 )</td>
<td></td>
<td>( 2x \div 2 = 8 \div 2 )</td>
</tr>
<tr>
<td>( x = 6 )</td>
<td></td>
<td>( x = 4 )</td>
</tr>
</tbody>
</table>
A rental car company uses the formula
\[ C = 0.41M + 21.95 \]
to calculate the cost of renting a car driven \( M \) miles. If your vacation budget allows you to spend $100 for car rental, how far can you drive?
\begin{align*}
\text{Solve: } & \quad x + 8 = -3 \\
\hline
x + 8 &= -3 \\
\hline
\end{align*}
Solve: \( x - 2 = 5 \)

<table>
<thead>
<tr>
<th>( x - 2 = 5 )</th>
<th></th>
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<tbody>
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</table>
Solve: $4x = -12$

<table>
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<tr>
<th>4X = -12</th>
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</table>
Solve: \( \frac{-2}{5} x = 4 \)
Solve: $4x - 7 = -27$

<table>
<thead>
<tr>
<th>$4x - 7 = -27$</th>
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</tbody>
</table>
Solve: \( \frac{1}{3} x + 4 = 6 \)
Solve: \( \frac{-4}{5} \times x = 12 \)
Solve: \( \frac{-4}{5} x = 12 \)
Solve: 5x - 11 = 4
Solve: $4x - 7 = -27$
Solve: \( 8x - 2 = 11x + 7 \)
Solve: \(2(4x+5)-3x = 24-2x\)
Solve: $3x + 5 = 4 - 5x$
Solve: \(3x - 8 = 4(5 - 3x) + 9\)
Solve: $3(2x+8) = 6x-7$
Solve: $3(2x+8) = 8x+24-2x$
A company determines that cost, \( C \), of making \( x \) items is \( C = 2.2x + 78 \) and the revenue, \( R \), is \( R = 2.25x \). Find the break even point.