Mat 011 Agenda  Day 4:  May 24, 2004
- Literal Equations, PowerPoint Lecture 7, S57
- Percentages, PowerPoint Lecture 9, S65
- Quiz #2
Homework:  Topics 9, 10 pages 71-72, 81-82
Web page: http://faculty.mc3.edu/rhofman/first.htm
Mat 011 Web page:
http://www.mc3.edu/aa/career/MATHSCI/mat011/mat011.htm
BlackBoard: http://courses.mc3.edu
Username: << 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
Two girls start a snow removal business. They pay $240 for the snow blower and charge $40 a driveway. If they clean 43 driveways, how much profit did they make?

\[ P = 40 \times 43 - 240 \]

What is the equation that relates profit and the number of driveways they clean? Use \( P \) for profit and \( d \) for number of driveways.

\[ P = 40d - 240 \]
Two girls start a snow removal business. They pay $240 for the snow blower and charge $40 a driveway. If they clean 43 driveways, how much profit did they make.

Let $P = \text{profit}$

$d = \# \text{ driveway}$

\[ P = 40(43) - 240 \]

\[ P = 1720 - 240 \]

\[ P = 1480 \]
Solve: \[ 3x + 5 = 4 - 5x \]

\[
\begin{array}{c|c|c|c|c|c}
3x + 5 &= 4 - 5x \\
15x &+ 5x
\
8x + 5 &= 0 \\
-5 &- 5
\end{array}
\]

\[
\frac{8x}{8} = -\frac{5}{8} = -0.125
\]
Solve: \[ 2(4x+5) - 3x = 24 - 2x \]

<table>
<thead>
<tr>
<th>Equation</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ 2(4x+5) - 3x = 24 - 2x ]</td>
<td></td>
</tr>
</tbody>
</table>
Solve: $3x + 5 = 4 - 5x$

<table>
<thead>
<tr>
<th>$3x + 5 = 4 - 5x$</th>
<th>$-3x$</th>
<th>$-3x$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$5 = 4 - 8x$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$-4$</td>
<td>$-4$</td>
</tr>
</tbody>
</table>

$$\frac{1}{-8} = \frac{-8 \cdot x}{-8}$$

$$-\frac{1}{8} = x$$
Solve: \( 3x - 8 = 4(5 - 3x) + 9 \)

\[
\begin{align*}
3x - 8 &= 4(5 - 3x) + 9 \\
3x - 8 &= 20 - 12x + 9 \\
3x - 8 &= 29 - 12x \\
-8 &= 29 - 15x \\
-37 &= -15x \\
\frac{-37}{-15} &= x \\
2.47 &= x
\end{align*}
\]
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.

\[
C = R
\]

\[
2.2x + 78 = 2.25x
\]

\[
-2.2x - 2.2x
\]

\[
78 = 0.05x
\]

\[
\frac{78}{0.05} = x
\]

\[
1560 = x
\]

items
Women’s recommended weight formula: “Give yourself 100 lbs plus 5 lbs for every inch over 5 ft tall.” (Remember 5 ft = 60 inches!)
\[ \begin{align*}
W &= 5(h - 60) + 100 \\
&= 5h - 300 + 100 \\
&= 5h - 200 \\
\Rightarrow
h &> 60
\end{align*} \]
Women’s recommended weight formula: “Give yourself 100 lbs plus 5 lbs for every inch over 5 ft tall.” (Remember $5\text{ ft} = 60\text{ inches}$!)

What is the equation that relates weight and height? Simplify the equation.
Women’s recommended weight formula: “Give yourself 100 lbs plus 5 lbs for every inch over 5 ft tall.” (Remember 5 ft = 60 inches!)

How tall should you be if you weigh 135 lbs?

\[ W = 5h - 200 \quad h > 60'' \]

\[
\begin{align*}
135 &= 5h - 200 \\
200 &= +200 \\
335 &= 5h \\
\frac{335}{5} &= \frac{5h}{5} \\
67'' &= h
\end{align*}
\]
Women’s recommended weight formula: “Give yourself 100 lbs plus 5 lbs for every inch over 5 ft tall.” (Remember 5 ft = 60 inches!)

How tall should you be if you weigh 85 lbs?

\[ W = 5h - 200 \quad h \geq 60'' \]

\[ 85 = 5h - 200 \]

\[ 285 = 5h \]

\[ h = \frac{285}{5} = 57'' \]
Women’s recommended weight formula: “Give yourself 100 lbs plus 5 lbs for every inch over 5 ft tall.” (Remember 5 ft = 60 inches!)

How tall should you be if you weigh zero lbs?

\[ W = 5h - 200 \quad h \geq 60'' \]

\[ 0 = 5h - 200 \]

\[ 200 + 200 \]

\[ 200 = 5h \]

\[ \frac{200}{5} = \frac{5h}{5} \]

\[ 40'' = h \]
Women's recommended weight formula: “Give yourself 100 lbs plus 5 lbs for every inch over 5 ft tall.” (Remember 5 ft = 60 inches!)

Solve the formula for \( h \).

\[
W = 5h - 200, \ h > 60
\]

\[
\frac{200 + 200}{5} = \frac{W + 200}{5} = \frac{\cdot h}{5}
\]

\[
h = \frac{W + 200}{5} = \frac{400}{5} = 80
\]

\[
= 80"\]
An repair store charges $50 for the first hour and $18 an hour for each additional hour.

<table>
<thead>
<tr>
<th>Hours</th>
<th>Calculations</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
An repair store charges $50 for the first hour and $18 an hour for each additional hour.

<table>
<thead>
<tr>
<th>Hours</th>
<th>Calculations</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>18(3-1) + 50</td>
<td>86</td>
</tr>
<tr>
<td>8</td>
<td>18(8-1) + 50</td>
<td>176</td>
</tr>
<tr>
<td>t</td>
<td>18(t-1) + 50</td>
<td>C</td>
</tr>
</tbody>
</table>

\[
C = 18(t-1) + 50 \quad t > 1
\]

\[
C = 18t - 18 + 50
\]

\[
C = 18t + 32 \quad t \geq 1
\]
An repair store charges $50 for the first hour and $18 an hour for each additional hour.

If it cost $230, how long did it take?

\[ C = 18t + 32 \quad t \geq 1 \]

\[
230 = 18t + 32
\]

\[
-32
\]

\[
198 = 18t
\]

\[
18
\]

\[
t = \frac{c - 32}{18}
\]
\[ t = \frac{c - 32}{18} \]
An repair store charges $50 for the first hour and $18 an hour for each additional hour. If it cost $140, how long did it take?

\[ t = \frac{c - 32}{18} \]

\[ t = \frac{(140 - 32)}{18} = \frac{108}{18} = 6 \text{ hrs} \]

\[ 5(18) + 50 \]

\[ 90 + 50 = 140 \]
An repair store charges $50 for the first hour and $18 an hour for each additional hour.

Solve for \( t \) in the equation: \( C = 18t + 32 \)
Solve for \( W \) in the equation: \( P = 2L + 2W \)

\[
\begin{align*}
-2L &= -2L \\
\frac{P - 2L}{2} &= \frac{2W}{2} \\
W &= \frac{P - 2L}{2}
\end{align*}
\]
Solve for $W$ in the equation: $P = 2L + 2W$.

\[ \begin{align*}
\text{L} & = -2W \\
\Rightarrow & \\
P - 2W & = 2L \\
\Rightarrow & \\
2 & = 2 \\
\Rightarrow & \\
L & = \frac{P - 2W}{2} \\
\end{align*} \]
Solve for \( y \) in the equation: \( 8x + 3y = 16 \)

\[ -8x = -8x \]

\[ 3y = 16 - 8x \]

\[ y = \frac{16 - 8x}{3} \]
## Percentages

<table>
<thead>
<tr>
<th>Percent</th>
<th>Decimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>.05</td>
</tr>
<tr>
<td>8.5%</td>
<td>.085</td>
</tr>
<tr>
<td>5%</td>
<td>.005</td>
</tr>
<tr>
<td>500%</td>
<td>5</td>
</tr>
</tbody>
</table>

If there is no decimal point, put a decimal point immediately after the number, then move the decimal point two places to the left.

\[ \frac{5}{1000} \]

\[ \frac{.05}{100} \]

\[ \frac{8.5}{100} \]

\[ \frac{85}{1000} \]

\[ \frac{.05}{.05} \]

\[ \frac{1.00}{5.00} \]
Percentages

What is 72% of 200?

Take the statement and write it algebraically.

<table>
<thead>
<tr>
<th>English</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>what</td>
<td>X</td>
</tr>
<tr>
<td>is</td>
<td>=</td>
</tr>
<tr>
<td>of</td>
<td>* (multiplication)</td>
</tr>
</tbody>
</table>

\[ X = 0.72 \times 200 \]

\[ X = 144 \]
Percentages

63 is what percent of 72?

\[ 63 = x \cdot 72 \]

\[ \frac{63}{72} = \frac{72x}{72} \]

87.5 = x

87.5\%
Percentages

120 is 15% of what number?

Take the statement and write it algebraically.

\[
120 = 0.15 \cdot x
\]

\[
\frac{120}{0.15} = x
\]

\[
x = 800
\]
Percentages
120 is 15% of what number?
$0.20 \rightarrow 0.25$

$0.05 \rightarrow 0.05$

$\frac{0.25}{4.00} = 6.25\%$

$4.00 - 4.25$

$0.25$

$\frac{4.00}{0.25} = 6.25\%$
Percentages

An item increases from $5.80 to $7.03. What is the percent increase?

Find the amount of the increase. \[
\frac{\text{New} - \text{Old}}{\text{Old}} = \text{rate of change}
\]

\[
\frac{7.03 - 5.80}{5.80} = \frac{212}{580} = 0.36842105263157894736842105263158 = 21.2\%
\]
Percentages

You get 9 out of 12 questions right on a quiz.

What percent did you get right?

\[
\frac{9}{12} = .75 = 75\%
\]
Walden's computes retail price (the price Walden's charges its customers for an item) by marking up the wholesale price (the price Walden's pays for the item) by 40%. Remember that wholesale price plus markup equals retail price.
Percentages

Walden’s computes retail price (the price Walden’s charges its customers for an item) by marking up the wholesale price (the price Walden’s pays for the item) by 40%. Remember that wholesale price plus markup equals retail price.

retail price = markup + wholesale price
Walden's computes retail price (the price Walden's charges its customers for an item) by marking up the wholesale price (the price Walden's pays for the item) by 40%. Remember that \textit{wholesale price plus markup equals retail price}.

\[ \text{retail price} = \text{markup} + \text{wholesale price} \]

<table>
<thead>
<tr>
<th>Wholesale</th>
<th>Markup</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>.40(10)</td>
<td>10+.40(10)=14</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Phillips Hardware Store is having a 20% off sale. What is the sale price of a mower that is usually priced $380? Remember that original price minus discount equals sale price.
Phillips Hardware Store is having a 20% off sale. What is the sale price of a mower that is usually priced $380?

Remember that original price minus discount equals sale price.
<table>
<thead>
<tr>
<th>PreSale Price</th>
<th>Discount</th>
<th>Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>.20(60)=12</td>
<td>60-.20(60)=48</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Phillips Hardware Store is having a 20% off sale. A step ladder has a sale price of $44. What was the price before the sale?

Remember that original price minus discount equals sale price.
A math teacher computes a student's grade for a course as follows: 10% for homework, 65% for test average, 25% for final exam. Compute Bill's grade for the course if he has 78 for homework, 81 for test average, 79 on final exam.
A math teacher computes a student's grade for a course as follows: 10% for homework, 65% for test average, 25% for final exam. Suppose Sue has an 82 homework average and a 63 test average. What does Sue have to get on the final exam to get a 70 for the course?
Two girls start a snow removal business. They pay $240 for the snow blower and charge $40 a driveway. If they clean 43 driveways, how much profit did they make.
1. WWW Drillers charge their customers $350.00 to come to the well site and $20.00 per foot to drill a well.

a. Complete the table.

<table>
<thead>
<tr>
<th>DEPTH OF WELL</th>
<th>CALCULATION</th>
<th>COST ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. WWW Drillers charge their customers $350.00 to come to the well site and $20.00 per foot to drill a well.

   If a person is charged $2,150.00 for a well, how deep is the well?
Take-Taxi Co. charges $1.35 immediately upon entering the taxi. The first 3 miles are free, and after that it costs $1.80 per mile.

Complete the table.

<table>
<thead>
<tr>
<th>MILES</th>
<th>CALCULATION</th>
<th>COST ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>m</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Take–Taxi Co. charges $1.35 immediately upon entering the taxi. The first 3 miles are free, and after that it costs $1.80 per mile.

Complete the table.

<table>
<thead>
<tr>
<th>MILES</th>
<th>CALCULATION</th>
<th>COST ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>m</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Take – Taxi Co. charges $1.35 immediately upon entering the taxi. The first 3 miles are free, and after that, it costs $1.80 per mile.

If it cost $27.50, how far was your ride?
Professor Failure computes his grades as follows:
Tests: 60%; Homework: 15%; Final Exam: 25%

Otto has a test average of 82, homework average of 99, and a final exam score of 71. What is Otto's grade for the course?
Professor Failure computes his grades as follows:
Tests: 60%; Homework: 15%; Final Exam: 25%

Tito has a test average of 71 and a homework average of 76. What does Tito have to get on the final to get a 70 for the course?
Clancy’s Burgers has given a 12% raise to all of its employees.

Complete the table below.

<table>
<thead>
<tr>
<th>OLD SALARY</th>
<th>CALCULATION</th>
<th>NEW SALARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.00 per hr.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$3.00 per hr.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X per hr</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Clancy’s Burgers has given a 12% raise to all of its employees. If your new salary is $5.25 per hour, what was your old salary?
Stats Department store is having a 20% off sale.

Complete the table

<table>
<thead>
<tr>
<th>ORIGINAL PRICE</th>
<th>CALCULATION</th>
<th>SALE PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Title: 5/29/2002  2:44 PM (54 of 65)
<table>
<thead>
<tr>
<th>ORIGINAL PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.00</td>
</tr>
<tr>
<td>20.00</td>
</tr>
<tr>
<td>p</td>
</tr>
</tbody>
</table>
Stats Department store is having a 20% off sale.

If the sale price was $81.00, what was the original price?
The graph shows the net profits and losses for Rose Stores for the years 1990 through 1993.
The graph shows the net profits and losses for Rose Stores for the years 1990 through 1993.

What is the difference between the profit or loss in 1990 and that in 1992?
The graph shows the net profits and losses for Rose Stores for the years 1990 through 1993.

What is the difference between the profit or loss in 1993 and that in 1991?
Simplify \(-2(x - 3) + 2(4 - x)\)
Is $x = -3$ a solution to $x^2 + 6x + 9 = x + 3$?
Solve: \[7x - 8 = -29\]
Solve: \[ 8x - 3(4x - 5) = -2x - 11 \]
11. A business manager has determined that the cost per unit for a camera is $70 and that the fixed costs per month are $3,500. Find the number of cameras that are produced during a month in which the total cost was $21,000. Use the equation

\[ T = U \times N + F \]

where \( T \) is the total cost, \( U \) is the cost per unit, \( N \) is the number of units produced, and \( F \) is the fixed cost.
12. \( P = 2W + 2L \), solve for \( W \).