Mat 011 Agenda Day 5    May 24, 2005

Return Quiz 2

Literal Equations, PowerPoint 7
Percentages, PowerPoint 9
Review Chapter, PowerPoint 10

Test 1 on Wednesday

Homework: Topics 9, 10, 11
Study for Test 1
Did you go to Blackboard for your grade?
You are offered two very similar jobs selling math textbooks. One (Company A) pays 8% commission plus $10,000 a year and the other (Company B) pays 12% commission.

What is the equation that relates wages and sales for companies A and B?

\[ W_A = 0.08S + 10,000 \]

\[ W_B = 0.12S \]

\[ W_B = W_A \]

\[ 0.12S = 0.08S + 10,000 \]

\[ 0.04S = 10,000 \]

\[ S = \frac{10,000}{0.04} \]

\[ S = \$250,000 \text{ in sales} \]
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>
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<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></td>
</tr>
</tbody>
</table>

Cost equation:

$$C = 18(t-1) + 50 \quad t \geq 1$$

$$C = 18t - 18 + 50$$

$$C = 18t + 32 \quad t \geq 1$$
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?

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

\[ 230 = 18t + 32 \]

\[ -32 \quad -32 \]

\[ 198 = 18t \]

\[ 11 = t \]

\[ 11 \text{ hours} \]

\[ 180 + 50 = 230 \]
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?

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

\[ 140 = 18t + 32 \]
\[ -32 \quad -32 \]
\[ 108 = 18t \]
\[ \frac{108}{18} = \frac{18}{18} \]
\[ 6 \text{ hours} = t \]
An repair store charges $50 for the first hour and $18 an hour for each additional hour.

Solve for \( t \) in the equation: \( C = 18t + 32 \)

\[
\begin{align*}
C - 32 &= 18t \\
\frac{C - 32}{18} &= t
\end{align*}
\]
Solve for $W$ in the equation: $P = 2L + 2W$

**Solve for $L$**

\[
\frac{P - 2W}{2} = \frac{2L}{2}
\]

\[
P - 2W = L
\]

\[
L = \frac{P - 2W}{2} = \frac{P}{2} - W
\]

**Factor $2$**
Solve for \( y \) in the equation: \( 8x + 3y = 16 \)

\[
\begin{align*}
8x &= 16 - 3y \\
\frac{8x}{8} &= \frac{16 - 3y}{8} \\
x &= \frac{16 - 3y}{8} \\
x &= \frac{-3y + 16}{8}
\end{align*}
\]
\[ 8\% = 0.08 = \frac{8}{100} \]

\[ 0.8\% = 8 \text{ per cent} \]

\[ \frac{8}{100} = 0.08 \]

\[ 12.5\% = 0.125 \]

\[ \frac{8}{100} \]

\[ 8 \% \]

\[ 8 \% \]
0.05 \% \quad 0.005 \% \quad 5 \%

\[ 0.05 = \frac{5}{100} \quad 0.005 = \frac{5}{1000} \quad 50 \%= \frac{50}{100} \]

5 miles
# Percentages

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

<table>
<thead>
<tr>
<th>Change to Decimals</th>
<th></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>5.00</td>
</tr>
</tbody>
</table>
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>( \times ) (multiplication)</td>
</tr>
</tbody>
</table>

\[ X = .72 \times 200 \]

\[ X = 144 \]
What is 72% of 200?

\[ x = (0.72) \times (200) \]

\[ x = 144 \]
Percentages

63 is what percent of 72?

\[ 63 = x \times 72 \]

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

\[ 0.875 = x \]

\[ 87.5\% = x \]
Percentages

120 is 15% of what number?

Take the statement and write it algebraically.

\[
120 = 0.15 \times x
\]

\[
\frac{120}{0.15} = \frac{800}{x}
\]

800 = x
Percentages

120 is 15% of what number?
Percentages

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

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

\[
\frac{7.03}{5.80} = 1.23
\]

\[
\frac{1.23}{5.80} = 0.212 = 21.2\%
\]
HC

\[ 4.00 - 4.25 \]

\[ \frac{.25}{4.00} = .0625 \]

6.25%

new - old

old

Salt

\[ .25 - .35 = .10 \]

\[ \frac{.10}{.25} = .40 \]

40%
You get 9 out of 12 questions right on a quiz.

What percent did you get right?

\[ \frac{9}{12} = 0.75 \Rightarrow 75\% \]

\[ \frac{12.5}{100} = 12.5\% \]

\[ \frac{75}{100} \]

\[ 12.55\% \]
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.

\[
\text{retail price} = \text{markup} + \text{wholesale price}
\]
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 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.
$120

20% discount

80% you pay

100%

$120

- 24

96

20%

80%

$96

$24
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.

\[ \text{Sale Price} = \text{Original Price} - (\text{Discounted Price} \times \text{Discount}) \]

\[ \text{Sale Price} = 380 - (380 \times 0.20) \]

\[ \text{Sale Price} = 380 - 76 \]

\[ \text{Sale Price} = 304 \]
<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>

\[ \begin{align*}
\text{80(50)} &= 40 \\
\text{80(40)} &= 32 \\
\end{align*} \]
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.

\[ SP = .80 \times OP \]

\[
\begin{align*}
44 &= .80 \times OP \\
.80 &= \frac{44}{.80} \\
\$55 &= OP
\end{align*}
\]

\[
\begin{align*}
55 - 11 &= 44
\end{align*}
\]

\[ D = .20 \times OP \]

\[
\begin{align*}
 &= \frac{55}{.20} \\
&= 275
\end{align*}
\]

\[
\begin{align*}
11.00 &= \frac{275}{25}
\end{align*}
\]
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.

\[
G = 0.10H + 0.65T + 0.25F
\]

\[
= 0.10(78) + 0.65(81) + 0.25(79)
\]

\[
= 7.8 + 52.65 + 19.75
\]

\[
G = 80.2
\]
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?

\[ G = 0.10H + 0.65T + 0.25F \]

\[ 70 = 0.10(82) + 0.65(63) + 0.25x \]

\[ 70 = 8.2 + 40.95 + 0.25x \]

\[ 70 = 49.15 + 0.25x \]

\[ 49.15 = 0.25x \]

\[ x = \frac{49.15}{0.25} \]

\[ x = 196.6 \]

\[ 83.4 = x \]
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>$20(50) + $350</td>
<td>$1350</td>
</tr>
<tr>
<td>70</td>
<td>$20(70) + $350</td>
<td>$1750</td>
</tr>
<tr>
<td>90</td>
<td>$20(90) + $350</td>
<td>$2150</td>
</tr>
<tr>
<td>d</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[ C = 20d + 350 \]
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?

\[C = 20d + 350\]

\[2150 = 20d + 350\]

\[-350 \quad -350\]

\[1800 = 20d\]

\[\frac{1800}{20} = \frac{20d}{20}\]

\[90 \text{ feet} = d\]
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>1.80(10-3)+1.35</td>
<td>$13.95</td>
</tr>
<tr>
<td>15</td>
<td>1.80(15-3)+1.35</td>
<td>$22.95</td>
</tr>
<tr>
<td>20</td>
<td>1.80(20-3)+1.35</td>
<td>$31.95</td>
</tr>
<tr>
<td>m</td>
<td>1.80(m-3)+1.35</td>
<td></td>
</tr>
</tbody>
</table>

\[ C = 1.80(m-3)+1.35 \quad m \geq 3 \]
\[ C = 1.80m - 5.40 + 1.35 \]
\[ C = 1.80m - 4.05 \quad m \geq 3 \]
\[ C = 1.80 \text{ m} - 4.05 \text{ m} = 3 \]
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?

\[ C = 1.80m - 4.05 \quad m = 3 \]

\[ 27.50 = 1.80m - 4.05 \]

\[ \frac{4.05}{4.05} + 4.05 \]

\[ 31.55 = 1.80m \]

\[ \frac{1.80}{1.80} \quad \frac{1.80}{1.80} \]

\[ 17.5 = m \]

\[ \text{miles} \]
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?

\[
G = .60T + .15H + .25E
\]
\[
= .60(82) + .15(99) + .25(71)
\]
\[
= 49.2 + 14.85 + 17.75
\]
\[
G = 81.8
\]
\[ G = 0.60T + 0.15H + 0.25E \]
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?

\[ G = 0.60T + 0.15H + 0.25E \]

\[ 70 = 0.60(71) + 0.15(76) + 0.25E \]

\[ 70 = 42.6 + 11.4 + 0.25E \]

\[ 70 = 54.0 + 0.25E \]

\[ \frac{70 - 54}{0.25} = E \]

\[ 64 = E \]
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>$1.12(1.00)</td>
<td>$1.12</td>
</tr>
<tr>
<td>$3.00 per hr.</td>
<td>$3.36(1.00)</td>
<td>$3.36</td>
</tr>
<tr>
<td>X per hr.</td>
<td></td>
<td>$1.12</td>
</tr>
</tbody>
</table>

\[ \frac{1.00}{1.12} + \frac{1.00}{1.12} = \frac{1.00}{1.12} \]
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>
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<tr>
<td>Original Price</td>
<td></td>
<td></td>
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<tr>
<td>---------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p</td>
<td></td>
<td></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.