Mat 011  Agenda  Day 25: 3/20/02

- Return Worksheets
- Ratio and Proportion, S219
- PowerPoint Lecture 26
- Quiz on Properties of Exponents

Homework: Topic 24, S223
$8^{-3} = .001953$

$-8^{-3} = -.001953$

$(-8)^{-3} = -.001953$
5. \[ 8 \cdot x^5 \cdot x^3 = 8x^8 \]

6. \[ (8x^3)^2 = 8^2 \cdot x^6 = 64x^6 \]

7. \[ (\frac{x^4}{2})^{-3} = \left(\frac{2}{x^4}\right)^3 = \frac{2^3}{x^{12}} = \frac{8}{x^{12}} \]
\[ P = A \left[ \frac{i}{1 - (1+i)^{-n}} \right] \]

\[ i = \frac{.06}{12} = .005 \]

\[ = 15,000 \left[ \frac{.005}{1 - (1.005)^{-36}} \right] \]

\[ = 15,000 \left[ \frac{.005}{1 - .8356} \right] \]

\[ = 15,000 \left[ \frac{.005}{.1644} \right] \]

\[ = 15,000 (0.030417) = 456.33 \]
\[ FV = P(1+i)^n \quad i = \frac{.08}{12} \]
\[ = 1500 \left(1 + .006667\right)^{240} \]
\[ = 1500 \left(1.006667\right)^{240} \]
\[ = 1500 \times 4.9272 \]
\[ = \$ 7390.80 \]
\[
\frac{12x^2}{3x^6} = \frac{4}{x^4}
\]
2. \[
\frac{2x^{-2}}{10x^3} = \frac{1}{5x^3 x^2} = \frac{1}{5x^5}
\]

\[
\frac{x^{-2-3}}{5} = \frac{x^{-5}}{5} = \frac{1}{5x^5}
\]
3. \((2x^3)^4\)

\[
(2x^3)^4 = 2^4 x^{12} = 16x^{12}
\]
\[
\frac{x^{-5}}{(2x^2)^{-4}} = \frac{x^{-5}}{\frac{1}{2^4 x^{-8}}} = \frac{16x^3}{x^5} = 16x^{-2}
\]
5. Compute the following using a calculator and write in scientific notation:

\[
\left(8.2 \times 10^{11}\right) \left(3.6 \times 10^{-2}\right)
\]

\[2.952 \times 10^{10}\]
Unit 3 Lecture 26
Ratio and Proportion

Ratio and Proportion
Objectives

- To set up proportion equations for a problem situation
- To solve proportion equations
### Ratio and Proportion

<table>
<thead>
<tr>
<th>Ratio:</th>
<th>A quotient of 2 numbers or quantities.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratio of 2 parts soap to 3 parts water</td>
<td>2:3 or ( \frac{2}{3} ) ( \frac{2}{3} )</td>
</tr>
<tr>
<td></td>
<td>2 to 3</td>
</tr>
</tbody>
</table>
# Ratio and Proportion

<table>
<thead>
<tr>
<th>Ratio:</th>
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</tr>
</thead>
</table>
| Ratio of 2 parts soap to 3 parts water | 2:3 or \[
|                              | \frac{2}{3}                             |

---

**Proportion**
## Ratio and Proportion

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<tbody>
<tr>
<td>Ratio of 2 parts soap to 3 parts water</td>
<td>2:3 or $\frac{2}{3}$</td>
</tr>
<tr>
<td></td>
<td>$\frac{3x}{3} = \frac{12}{3}$</td>
</tr>
<tr>
<td></td>
<td>$x = \frac{4}{3}$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Proportion</th>
<th>A mathematical statement that 2 ratios are equal.</th>
</tr>
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<tbody>
<tr>
<td>How parts of soap to 6 parts of water?</td>
<td>$\frac{2}{3} = \frac{x}{6}$</td>
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</table>
## Ratio and Proportion

<table>
<thead>
<tr>
<th>Ratio:</th>
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</table>
| Ratio of 2 parts soap to 3 parts water | 2:3 or \[
\frac{2}{3}
\] |
| Proportion                   | A mathematical statement that 2 ratios are equal. |
| How parts of soap to 9 parts of water? | \[
\frac{x}{9} = \frac{2}{3}
\] |
### Ratio and Proportion

**Solve the equation for x**

<table>
<thead>
<tr>
<th>Equation</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{x}{9} = \frac{2}{3} )</td>
<td>( x = \frac{18}{3} ) = 6</td>
</tr>
<tr>
<td>( \frac{2}{4} = \frac{1}{2} )</td>
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</tr>
</tbody>
</table>
## Ratio and Proportion

<table>
<thead>
<tr>
<th>$\frac{6}{x} \rightarrow \frac{5}{7}$</th>
<th>Solve the equation for $x$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{5x}{5} = \frac{42}{5}$</td>
<td></td>
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<tr>
<td>$x = \frac{42}{5}$</td>
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<tr>
<td>$x = 8.4$</td>
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</tbody>
</table>
To estimate the number of fish in a lake, 30 fish are caught, tagged and released. Later 70 fish are caught and 14 are found to have been tagged. Estimate the number of fish in the lake.

\[
\frac{30 \text{ tagged}}{X \text{ in lake}} = \frac{14 \text{ tagged}}{70}
\]

\[
\frac{14X}{14} = \frac{2100}{14}
\]

\[
X = 150 \text{ fish}
\]
To estimate the number of fish in a lake, 30 fish are caught, tagged and released. Later 70 fish are caught and 14 are found to have been tagged. Estimate the number of fish in the lake.

14 tagged = 30 tagged
70 caught   X fish in lake

\[
\frac{14}{70} = \frac{30}{X} \quad \text{and} \quad 14X = 70 \cdot 30 \quad \text{then} \quad 14X = 2100 \quad \text{and} \quad X = 150 \text{ fish}
\]
Two people put their money together to buy lottery tickets. The first person puts in $15 and the second puts in $25. If they won 2.4 million dollars, how much does each person win?

\[
\frac{15}{25} = \frac{x}{2.4} \quad 40x = 36 \quad x = 0.9 \text{ million}
\]

\[
\frac{25}{40} = \frac{x}{2.4} \quad x = 1.3 \text{ million}
\]
Ratio and Proportion

Two people put their money together to buy lottery tickets. The first person puts in $15 and the second puts in $25. If they won 2.4 million dollars, how much does each person win?
The total amount put together is $15 + $25 = $40.
Let \( x = \text{amount each person wins.} \)

\[
\frac{x}{2.4} = \frac{15}{40}
\]

Solve for \( x \) for 1st person

<table>
<thead>
<tr>
<th>( \frac{x}{2.4} )</th>
<th>( \frac{15}{40} )</th>
<th>Solve for ( x ) for 1st person</th>
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Ratio and Proportion

Two people put their money together to buy lottery tickets. The first person puts in $15 and the second puts in $25. If they won 2.4 million dollars, how much does each person win? The total amount put together is $15+$25 = $40. Let \( x \) = amount each person wins.

\[
\frac{x}{2.4} = \frac{25}{40}
\]

<table>
<thead>
<tr>
<th>Solve for ( x ) for 2(^{nd} ) person</th>
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Lecture 26
5. $7x^4 x^3$
6. \((7x^4)^3\)
\[
\left( \frac{x^5}{2} \right)^{-3}
\]
\[
\frac{x^{-3}}{(3x^4)^{-5}}
\]
9. \( \frac{5x^{-3}}{20x^4} \)
Simplify: \( \frac{2}{9x} \div 4x^5 \)
Simplify: \( \frac{3}{4x^2} + \frac{8}{3x} \)
Simplify: $6x + \frac{4x}{9}$
Solve for x: \( \frac{4x - 5}{3} - \frac{x - 2}{4} = \frac{-1}{12} \)
5. Solve for $x$: \[ \frac{x-4}{2} - \frac{x-3}{9} = \frac{5}{18} \]