Focus Area Topic A:

Finding the Whole

Students convert percents that are less than 1% or greater than 100% to a fraction or decimal.

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<tr>
<th>Focus</th>
<th>Explanation</th>
<th>Example(s)</th>
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<tbody>
<tr>
<td>Percents less than 1%</td>
<td>Since percent means per 100 you can change the percent to a fraction by simply putting the percent over 100 and then divide by 100 to convert to a decimal.</td>
<td>( \frac{1}{4} ) or 0.25% = ( \frac{1}{4} ) or ( 0.25 \cdot \frac{100}{100} = 0.0025 )</td>
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<tr>
<td>Percents greater than 100%</td>
<td>Look like numbers that are bigger than 100% because they are bigger than the ratio ( \frac{100}{100} ).</td>
<td>225% = ( \frac{225}{100} = \frac{9}{4} )</td>
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<tr>
<td>Non-whole number percents</td>
<td>Written as complex fractions and divided by 100.</td>
<td>37.5% = ( \frac{37.5}{100} = 0.375 )</td>
</tr>
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</table>

Part of a Whole as a Percent

Students solve percent problems using visual models and proportional reasoning then make connections to solving percent problems using numeric and algebraic methods.

Example:

In Ty’s math class, 20% of students earned an A on a test. If there were 30 students in the class, how many got an A?

A Visual Approach to Finding a Part, Given a Percent of the Whole

20% of 30 students

- 30 students make up 100% of the class.
- There are 5 intervals of 20% in the tape diagram.
- If you divide the 30 students into 5 intervals you have 6 students in each interval.

6 students are 20% of Ty’s class, therefore 6 students got an A on the test.

A Numeric Approach to Finding a Part, Given a Percent of the Whole

\[ \frac{30}{100} \rightarrow \frac{1}{100} \]

- Identify the whole
- Divide both sides by 100
- Multiply both sides by 20
- 6 is 20% of 30

MATH NEWS

Grade 7, Module 4, Topic A
Finding the Whole

Part of a Whole as a Percent (continued)

An Algebraic Approach to Finding a Part, Given a Percent of the Whole

The percent equation \( \text{Part} = \text{Percent} \times \text{Whole} \) can be used to solve the problem when given two of its three terms.

To solve a percent word problem, first identify the whole quantity in the problem, and then the part and percent. Use a variable to represent the term whose value is unknown.

\[ \frac{\text{Part}}{\text{Whole}} = \frac{\text{Percent}}{100} \]

\[ \text{Quantity} = \text{Percent} \times \text{Whole} \]

Comparing Quantities with Percent

Since the part in a percent problem may be greater than the whole, the formula \( \text{Part} = \text{Percent} \times \text{Whole} \) will be changed to \( \text{Quantity} = \text{Percent} \times \text{Whole} \) from this point forward. A visual model will help in understanding the problems that compare quantities with percents. The arithmetic method or an equation can be used to solve the problems.

Example:
The members of a club are making friendship bracelets to sell to raise money. Anna and Emily made 54 bracelets over the weekend. They need to produce 300 bracelets by the end of the week. What percent of the bracelets were they able to produce over the weekend?

Visual Model

\[ \text{Quantity} = \text{Percent} \times \text{Whole} \]

\[ 54 = \frac{1}{5} \times 300 \]

Anna and Emily were able to produce 18% of the total number of bracelets over the weekend.

Percent Increase and Decrease

Percent increase and percent decrease are measures of percent change, which is the extent to which something gains or loses value. Percent changes are useful to help people understand changes in a value over time.

Percent Increase

Example:
Cassandra likes jewelry. She has five rings in her jewelry box. Cassandra’s aunt said she will buy Cassandra another ring for her birthday. If Cassandra gets the ring for her birthday, what will be the percent increase in her ring collection?

\[ \text{Quantity} = \text{Percent} \times \text{Whole} \]

\[ 1 = \frac{p}{5} \times 300 \]

\[ 1 = \frac{p}{5} \]

Cassandra’s ring collection increased by 20%.

Percent Decrease

Example:
Ken said that he is going to reduce the number of calories that he eats during the day. Ken’s trainer asked him to start off small and reduce the number of calories by no more than 7%. Ken estimated and consumed 2,200 calories per day instead of his normal 2,500 calories per day until his next visit with the trainer. Did Ken reduce his calorie intake by 7%? Justify your answer.

\[ \text{Quantity} = \text{Percent} \times \text{Whole} \]

\[ 300 = \frac{7}{100} \times 2,500 \]

\[ 300 = 0.07 \times 2,500 \]

\[ 300 \neq 175 \]

False, because 300 ≠ 175.

Find One Hundred Percent Given Another Percent

A variety of methods can be applied to find 100% of a quantity (the whole) when given a quantity that is a percent of the whole.

Example:
The 42 students who play wind instruments represent 75% of the students who are in band. How many students are in band?

\[ 42 = \frac{75}{100} \times 56 \]

\[ 42 = 0.75 \times 56 \]

\[ 42 = 40.5 \]

\[ 56 \rightarrow 100\% \]

There are 56 students in the band.