Relating Fractions, Decimals, and Percents

Focus Relate percent to fractions and decimals.

We see uses of percent everywhere.

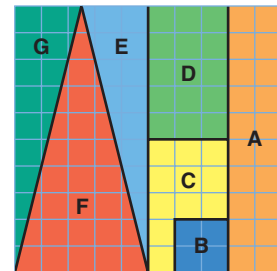What do you know from looking at each picture?
Recall that percent means per hundred.

49% is $\frac{49}{100} = 0.49$

Explore

Your teacher will give you a large copy of this puzzle.
Describe each puzzle piece as a percent, then as a fraction
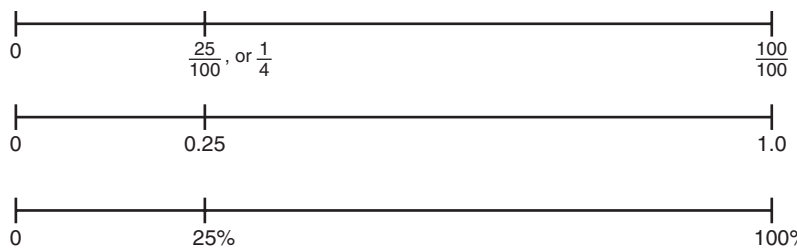and a decimal of the whole puzzle.

Reflect & Share

Compare your answers with those of another pair of classmates.
If the answers are different, how do you know which are correct?

Connect

➤ We can use number lines
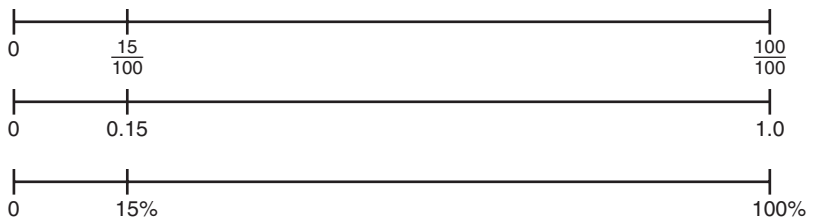to show how percents
relate to fractions
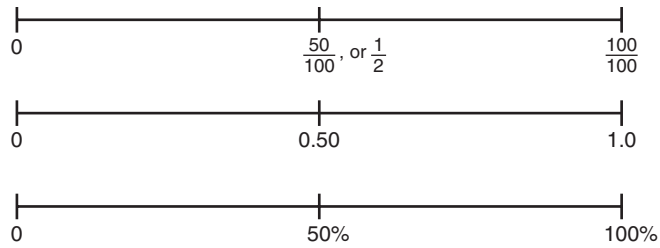and decimals.
For example:
$25\% = \frac{25}{100} = 0.25$

➤ Conversely, a decimal
can be written as a percent:
$0.15 = \frac{15}{100} = 15\%$

➤ To write a fraction as a percent, write the equivalent fraction with denominator 100. For example:

$$\frac{1}{2} = \frac{50}{100} = 50\%$$

(×50 arrows shown)

Number lines:
0 — $\frac{50}{100}$, or $\frac{1}{2}$ — $\frac{100}{100}$

0 — 0.50 — 1.0

0 — 50% — 100%

Example

a) Write each percent as a fraction and as a decimal.
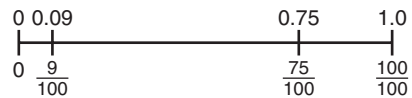 **i)** 75%   **ii)** 9%

b) Write each fraction as a percent and as a decimal.
  i) $\frac{2}{5}$ **ii)** $\frac{7}{20}$

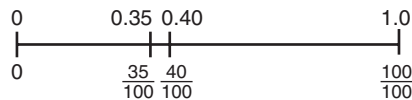Draw number lines to show how the numbers are related.

A Solution

a) i) $75\% = \frac{75}{100} = 0.75$
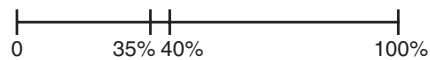
Number lines:
0 0.09 .... 0.75 .... 1.0
0 $\frac{9}{100}$ .... $\frac{75}{100}$ $\frac{100}{100}$

ii) $9\% = \frac{9}{100} = 0.09$

0 9% 75% 100%

b) i) $\frac{2}{5} = \frac{40}{100} = 40\% = 0.40$

(×20 arrows shown)

Number lines:
0 ...... 0.35 0.40 ...... 1.0
0 ...... $\frac{35}{100}$ $\frac{40}{100}$ ...... $\frac{100}{100}$

ii) $\frac{7}{20} = \frac{35}{100} = 35\% = 0.35$

(×5 arrows shown)

0 ...... 35% 40% 100%

Practice

1. What percent of each hundred chart is shaded?
Write each percent as a fraction and as a decimal.

a)

b)

c)
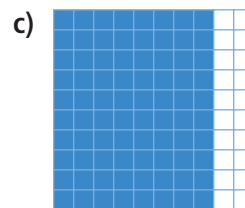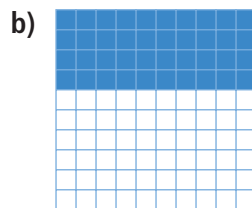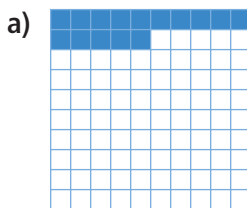
2. Write each percent as a fraction and a decimal.
Sketch number lines to show how the numbers are related.
   a) 2%   **b)** 9%   **c)** 28%   **d)** 95%

3. Write each fraction as a decimal and a percent.
   a) $\frac{2}{10}$ **b)** $\frac{3}{50}$ **c)** $\frac{4}{25}$ **d)** $\frac{13}{20}$ **e)** $\frac{4}{5}$

4. Fred had 8 out of 10 on a test. Janet had 82% on the test.
Who did better? How do you know?

5. (**Assessment Focus**) You will need a sheet of paper
and coloured pencils.
Divide the paper into these 4 sections.
   - 1 blue section that is $\frac{1}{2}$ of the page
   - 1 red section that is 10% of the page
   - 1 yellow section that is 25% of the page
   - 1 green section to fill the remaining space.
Explain how you did this.
What percent of the page is the green section?
How do you know?

6. **Take It Further** Suppose each pattern is continued on a hundred chart.
The numbers in each pattern are coloured red.
For each pattern, what percent of the numbers on the chart are red?
Explain your strategy for each pattern.
   a) 4, 8, 12, 16, 20, …   **b)** 1, 3, 5, 7, …   **c)** 2, 4, 8, 16, …   **d)** 1, 3, 7, 13, …

Reflect

Suppose you know your mark out of 20 on an English test.
Tell how you could write the mark as a decimal and a percent.