Ordering Fractions, Decimals, and Percents Using Multiple Strategies

The three strategies to order fractions, decimals, and percents being shown are:

1. converting to fractions with common denominators
2. converting to decimals
3. using an open number line

NOTE TO TEACHER: This lesson is sequenced in a way so that the first example and you try work well for all of the strategies. This is to help students become comfortable with the strategies without any real roadblocks. On the second example and you try, the teacher should model using a think aloud to pick one strategy because it works well and is efficient. Students should exhibit this same "thinking" when attempting the you try. Both the teacher and the student should write out a justification, as well as the answer, on the third example and you try.

Example #1: Order $80\%, \frac{9}{10}, and\, 0.250$ from least to greatest.

Convert to Fractions

$$80\% = \frac{80}{100}$$

$$\frac{9}{10} = \frac{9}{10} \times \frac{10}{10} = \frac{90}{100}$$

$$.250 = \frac{250}{1000} \div \frac{10}{10} = \frac{25}{100}$$

$\therefore$ from least to greatest: $.250, 80\%, \frac{9}{10}$

Convert to Decimals

$$80\% = .80$$

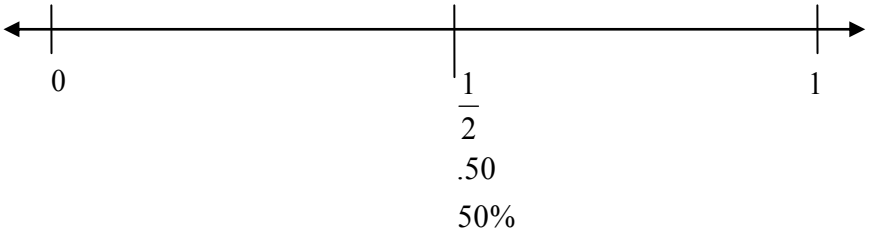
$$\frac{9}{10} = 0.9$$

$$.250 = .250$$

$\therefore$ from least to greatest: $.250, 80\%, \frac{9}{10}$

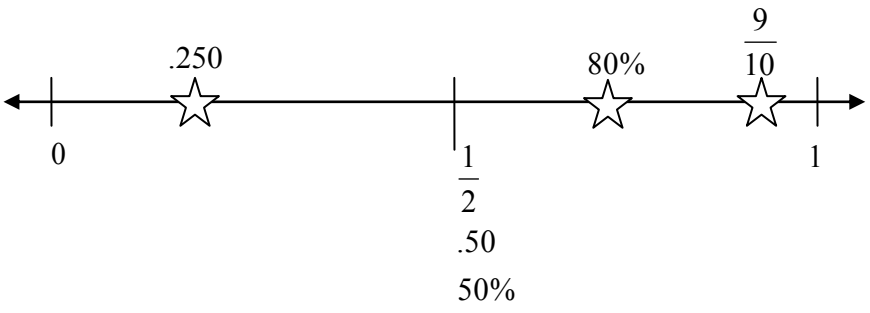
Using an Open Number Line

Create a number line that is able to encompass all of the numbers. Since these numbers all fall between 0 and 1, that's how I'll create this line.



I've added the halfway point on the number line and labeled it with a fraction, a decimal, and a percent.

Now place each number on the side where it belongs…either between 0 and 1 or between $\frac{1}{2}$ and 1.



Since $.250$ is the only number that is between 0 and $\frac{1}{2}$, it is the least. Now only 80% and $\frac{9}{10}$ need to be ordered. Help students think through this process or they can convert to fractions or decimals.

Think aloud: Since $\frac{9}{10}$ is closer to one whole than 80%, $\frac{9}{10}$ is the greatest and 80% is the middle term.

$\therefore$ least to greatest: $.250$, 80%, $\frac{9}{10}$

You Try #1: Order $\frac{7}{20}, 1.25$ and 82% from least to greatest.

Convert to Fractions

$\frac{7}{20} = \frac{7}{20}$

$1.25 = 1\frac{1}{4}$

$82\% = \frac{82}{100}$

The LCM of 20, 4, and 100 is 100.

$\frac{7}{20} \times \frac{5}{5} = \frac{35}{100}$

$1\frac{1}{4} \times \frac{25}{25} = 1\frac{25}{100}$

$\frac{82}{100} = \frac{82}{100}$

$\therefore$ from least to greatest: $\frac{7}{20}, 82\%, 1.25$

Convert to Decimals

$\frac{7}{20} \times \frac{5}{5} = \frac{35}{100}$

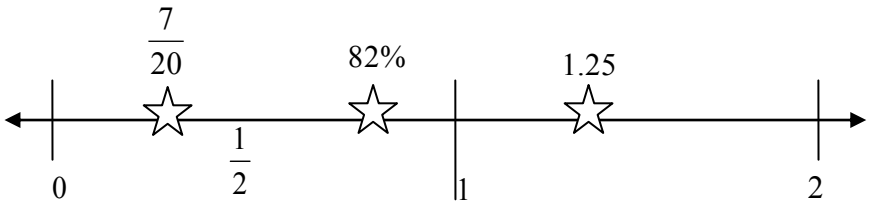
$= 0.35$

$1.25 = 1.25$

$82\% = 0.82$

$\therefore$ from least to greatest: $\frac{7}{20}, 82\%, 1.25$

Using an Open Number Line



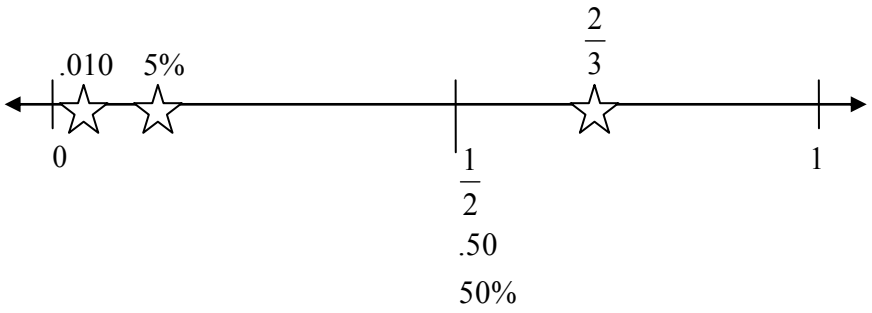
1.25 is the only term greater than one whole. $\frac{7}{20}$ is less than $\frac{10}{20}$, which is equivalent to $\frac{1}{2}$, and 82% is greater than $\frac{1}{2}$ or 50%.

$\therefore$ least to greatest: $\frac{7}{20}$, 82%, 1.25

Example #2: Order $\frac{2}{3}, .010$, and 5% from least to greatest.

Looking at this example, teacher should think aloud their process as to which strategy they are choosing. Converting to fractions might be messy with thirds being one of the terms. That would also make it messy to convert to decimals so I'm going to use the number line.

Using an Open Number Line



$\frac{2}{3}$ is the only term that falls between $\frac{1}{2}$ and 1. Five percent (5%) can be converted to a decimal of $.05$ and then compared to $.010$ or students may convert $.010$ to 1%.

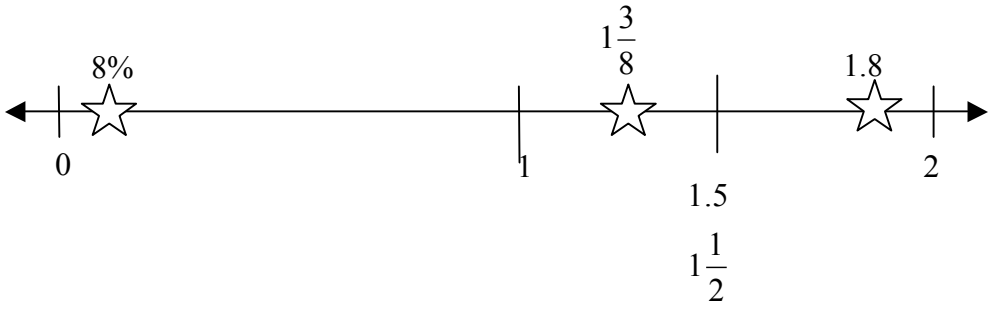
$\therefore$ least to greatest: $.010,\ 5\%,\ \frac{2}{3}$

You Try #2: Order $2\frac{2}{5}, 225\%$ and 2.20 from least to greatest.

Since all numbers fall on the same side of the number line between 2 and $2\frac{1}{2}$, this strategy would be inefficient. Students will need to choose one of the other strategies to order these numbers. Have students work in table groups or pairs. After monitoring the room, choose students who solved in different ways debrief the problem.

$\therefore$ from least to greatest: $2.20, 225\%, 2\frac{2}{5}$

Example #3: Order $1\frac{3}{8}, 1.8,$ and 8% from least to greatest. Justify the strategy used as well as the answer.



I chose the number line as my strategy because I realized I could place each of those numbers on it in order without having to convert or use any computation. All of the numbers fall between 0 and 2 with 1 being the midpoint. 8% is the only term less that one so that was placed first. Then I found the midpoint between 1 and 2, which is $1\frac{1}{2}$ or 1.5. One and eight tenths (1.8) is greater than 1.5 so I placed it between 1.5 and 2. Because $\frac{3}{8}$ is less than $\frac{4}{8}$, which is equivalent to $\frac{1}{2}$, I knew that $1\frac{3}{8}$ fell between 1 and $1\frac{1}{2}$. Therefore, from least to greatest, the answer is $8\%, 1\frac{3}{8}, 1.8$.

You Try #3: Order $3.75, 89\%,$ and $2\frac{8}{9}$ from least to greatest. Justify the strategy used as well as your answer.

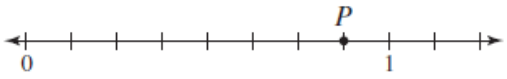
[Answer: from least to greatest: $89\%, 2\frac{8}{9}, 3.75$. Justifications will vary. Have students work in pairs to justify their work. Then have them link with another pair to compare their thought process. Pick a few pairs to debrief or have students display their work and do a gallery walk.]

Exit Card

At the end of the lesson, post the following question and have students work individually. Mr. Smith's class was given the task of ordering $1\frac{4}{5}, 1.55,$ and 175% from least to greatest. Sammy decided to use the number line, whereas Aimee said the number line strategy was not that helpful. Who was correct and why? What strategy would you use? Why? Justify your answer.

Date _____

Warm-Up

CST/CAHSEE:	Review:
18 **What fraction is best represented by point *P* on this number line?**  **A** $\frac{1}{8}$ **B** $\frac{1}{5}$ **C** $\frac{3}{4}$ **D** $\frac{7}{8}$ Approximately place the other fractions where they would fall on the number line.	Order from least to greatest. $0.287, 0.276, 0.285, 0.274$ $3.020, 3.002, 3.200$ $\frac{5}{6}, \frac{1}{4}, \frac{5}{12}$

Current:	Other:
Mark and Tom started with the same number of tickets. Mark sold 0.7 of his tickets for Track and Field Day. Tom sold $\frac{3}{4}$ of his tickets. Mark says that they both sold the same number of tickets. Is Mark correct? Explain your answer.	**13. Last year $\frac{7}{16}$ of all students at a school participated in the science fair. About what percentage of the students participated?** **A** 18% **B** 23% **C** 44% **D** 56% Is there a way to figure out the answer without any computation? Justify your answer.

Today's Objective/Standards: Ordering Fractions, Decimals and Percents