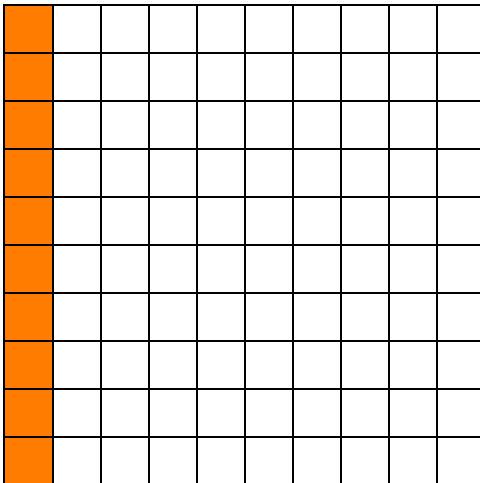# PROBLEM SOLVED
MAKING SENSE OF MATHEMATICS

1. Andy says that 5.10 is greater than 5.9 because 10 is greater than 9. Use two different methods to explain to Andy why his statement is incorrect.
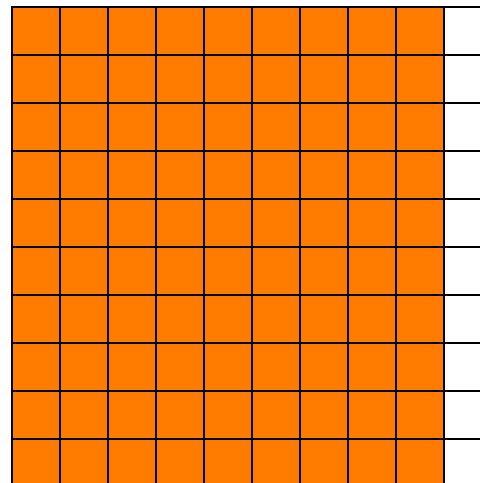   **Method 1:** Compare the decimal parts of each number using an area model.
   The whole number portion of each number is the same so you can compare the decimal portions, 0.10 and 0.9 using an area model. The grids show 0.9 is greater than 0.10.
   0.10   0.9

   Method 2: Compare the decimals using fractions.

   5.10 is equivalent to $5\frac{10}{100}$ or $5\frac{1}{10}$; 5.9 is equivalent to $5\frac{9}{10}$. So 5.9 is larger than 5.10.

   Method 3: Compare the decimals using place value.
   5.10 is equivalent to 5 ones, 1 tenth, 0 hundredths; 5.9 is equivalent to 5 ones, 9 tenths. 9 tenths is larger than 1 tenth.

   Andy's statement is incorrect; 5.9 is greater than 5.10.

2. Following is the list of swimmers and their times for a particular race. Fill in the chart to show the place each swimmer finished. Explain your reasoning.

Name	Time (in seconds)	Place
Jordan	43.3	Fourth
Taylor	43.4	Sixth
Morgan	43.05	First
Robin	43.25	Second
Skylar	43.251	Third
Bryce	43.308	Fifth

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Reasoning:
1. All the numbers have 4 tens and 3 ones, so compare the tenths place.
2. 43.05 has the least tenths, so it is the smallest decimal.
3. 43.25 and 43.251 each have 2 tenths and 5 hundredths, but 43.251 also has 1 thousandth, so it is a little bigger than 43.25.
4. 43.3 and 43.308 each have 3 tenths, but 43.308 also has 8 thousandths, so it is a little bigger than 43.3.
5. 43.4 has 4 tenths, so it is the biggest decimal.

3. Plot the following decimals on the number line below. Explain your reasoning.

a) 0.8   b) 0.009   c) 0.47   d) 0.09   e) 0.983
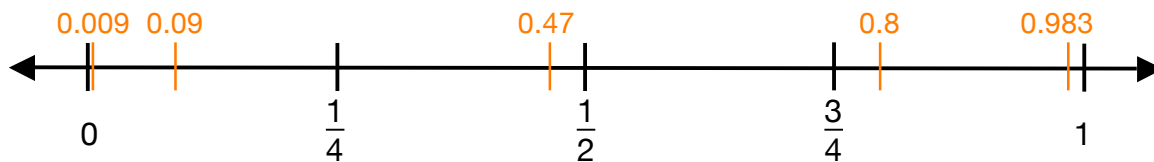
Reasoning:

0.8 is a little more than $\frac{3}{4}$, because $\frac{3}{4}$ is equivalent to 0.75.

0.009 is equivalent to $\frac{9}{1000}$. It is very small and close to 0.

0.47 is a little less than $\frac{1}{2}$, because $\frac{1}{2}$ is equivalent to 0.5.

0.09 is equivalent to $\frac{9}{100}$. It is close to 0, but it is larger than 0.009.

0.983 is very close to 1, since it is only 17 thousandths less than 1.

4. Students from Lawrence Middle School are training for a biathlon. For one particular training session, the students swam for three minutes and then ran for thirty minutes. The coach recorded the distances that each student swam (0.69, 0.084, 0.833, 0.609, 0.069, and 0.056 kilometers) and ran (8.25, 4.95, 6.2, 9.1, 10.6, and 3.32 kilometers). After recording the swimming distances for two students, the coach forgot to write down the other distances next to the names. Use the following clues to help the coach complete the table. Explain your reasoning.

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Name	Swim Distance in km	Run Distance in km
Nathan	0.069	**6.2**
Stephen	0.056	**8.25**
David	**0.609**	**9.1**
Abby	**0.084**	**3.32**
Lisa	**0.69**	**10.6**
Kendra	**0.833**	**4.95**

A) Lisa swam sixty-nine hundredths kilometers.

B) The person that swam eight hundred thirty-three thousandths kilometers ran four and ninety-five hundredths kilometers.

C) Nathan was not the one who ran eight and twenty-five hundredths kilometers.

D) David swam less than eight hundred thirty-three thousandths kilometers.

E) The number of kilometers Kendra swam, rounded to the nearest tenth, was eight-tenths kilometers.

F) The person that swam eighty-four thousandths kilometers ran three and thirty-two hundredths kilometers.

G) Abby was not the one who ran six and two-tenths kilometers.

H) The person that swam sixty-nine hundredths kilometers ran ten and six-tenths kilometers.

I) Abby ran less than eight and twenty-five hundredths kilometers.

J) The person that swam six hundred nine thousandths kilometers ran nine and one-tenth kilometers.

Reasoning:

1. Clue A—Lisa swam 0.69 km.
2. Clue H—The person who swam 0.69 km ran 10.6 km, so Lisa ran 10.6 km.
3. Clue E—When 0.833 is rounded to the nearest tenth, it equals 0.8, so Kendra swam 0.833 km.
4. Clue B—The person who swam 0.833 km ran 4.95km. That person was Kendra.
5. Clue I—Abby ran less than 8.25 km (6.2 or 3.32, since Kendra ran 4.95).
6. Clue G—Abby did not run 6.2 km, so the only distance left is 3.32 km.
7. Clue F—The person who swam 0.084 km ran 3.32 km. That person was Abby.
8. David swam 0.609 km, since it is the only swimming distance left.
9. Clue J—The person that swam 0.609 km ran 9.1 km. That person was David.
10. Clue C—Nathan was not the one who ran 8.25 km, so Nathan ran 6.2 km.
11. Stephen ran 8.25 km.

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