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WARMUP 8/(5)⁹⁵

On the last page of your binder, start a new “Week 3 Warmups” page!!!

Blake converted the fraction $\frac{5}{6}$ into a decimal and got 1.2.

- 1) Explain how you know Blake’s answer is unreasonable.**
- 2) What mistake do you think Blake made that led to this answer?**
- 3) Make an estimate for what you think the actual answer will be.**
- 4) Check your estimate using long division.**

COLLECT LISCHWE AGE PROBLEM PART 2

WARNING:

- Your first quiz will be on Friday!!!
 - Fractions, Decimals, Roots

Converting Fractions and Decimals

Objectives:

- Convert fractions to decimals
- Convert regular decimals to fractions
- Convert repeating decimals to fractions

**Go back to this
page of notes!!!**

DO WE REMEMBER HOW IT WORKS WITH DECIMALS???

$$0.8 \overline{) 1.3648}$$

1.706

DECIMALS REVIEW

My Estimate

Answer

1. $124.6 \cdot 0.78$

97.188

2. $0.6 \overline{)2.53}$

4.21 $\overline{6}$

EVEN THE BEST OF US MAKE MISTAKES SOMETIMES...

- Sometimes you may accidentally put the denominator inside the “house”.
- This is why it is **SO IMPORTANT** to predict what the answer will be/check to see if it's reasonable.
- If you accidentally switch the numbers, your answer **WILL** be unreasonable. You will catch your mistake every time!!!

NEW OBJECTIVE

- Converting from decimals to fractions
- (This one is VERY VERY easy if you know what you're doing!)

DO WE REMEMBER PLACE VALUE?

98765.4321

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DECIMAL → FRACTION

Strategy: Just use the place value of the decimal!

Convert from decimals to fractions. Simplify if possible.

$$\text{a) } 0.45 = \frac{45}{100} \rightarrow \frac{9}{20}$$

$$\text{b) } -2.7 = -2\frac{7}{10} \text{ (could convert to } -\frac{27}{10} \text{ but don't have to)}$$

$$\text{c) } 4.3701 = 4\frac{3701}{10000}$$

WHAT ABOUT REPEATING DECIMALS?

- Convert $0.\overline{2}$ into a fraction.

$$\text{Let } x = 0.22222 \dots$$

$$10x = 2.22222 \dots \quad \text{Multiply both sides by 10.}$$

$$\begin{array}{r} -x \\ 10x \end{array} \quad \begin{array}{r} -0.22222 \dots \\ 2.22222 \dots \end{array} \quad \text{Take away } 1x \text{ from both sides.}$$

$$\frac{9x}{9} = \frac{2}{9}$$

Divide both sides by 9.

$$x = \frac{2}{9}$$

$$\text{SO: } 0.\overline{2} = \frac{2}{9}$$

WHAT ABOUT REPEATING DECIMALS?

- Convert $0.\overline{7}$ into a fraction.

$$\text{Let } x = 0.77777 \dots$$

$$10x = 7.77777 \dots \quad \text{Multiply both sides by 10.}$$

$$\begin{array}{r} -x \\ \hline -0.77777 \dots \end{array} \quad \text{Take away } 1x \text{ from both sides.}$$

$$\begin{array}{r} 9x = 7 \\ \hline 9 \end{array}$$

Divide both sides by 9.

$$x = \frac{7}{9}$$

$$\text{SO: } 0.\overline{7} = \frac{7}{9}$$

WHAT ABOUT REPEATING DECIMALS?

- Convert $0.\overline{34}$ into a fraction.

Let $x = 0.343434 \dots$

~~$10x = 3.434343 \dots$~~ Doesn't work!!!

$100x = 34.343434 \dots$ Multiply both sides by 100.

$-x = -0.343434 \dots$ Take away $1x$ from both sides.

$$\begin{array}{r} 99x = 34 \\ \hline 99 \quad 99 \end{array}$$

Divide both sides by 99.

$$x = \frac{34}{99}$$

SO: $0.\overline{34} = \frac{34}{99}$

REPEATING DECIMALS: PATTERN

$$0.7 \text{ is } \frac{7}{10}, \quad \text{but } 0.\bar{7} = \frac{7}{9}$$

$$4.2 \text{ is } 4\frac{2}{10}, \quad \text{but } 4.\bar{2} = 4\frac{2}{9}$$

$$0.706 \text{ is } \frac{706}{1000}, \quad \text{but } 0.\overline{706} = \frac{706}{999}$$

TWO WAYS TO UNDERSTAND THE PATTERN

1. The repeating digits are the numerator. However many digits there are, that's how many "9's" are in the denominator.
2. Think of what the fraction would be if the digits weren't repeating, then subtract the denominator by 1.

MAKING GOOD ESTIMATES

$$\blacksquare \frac{30}{60} = 0.5$$

$$\blacksquare \frac{28}{60} = \text{A little less than } 0.5!$$
$$0.4\overline{6}$$

$$\blacksquare \frac{100}{400} = 0.25$$

$$\blacksquare \frac{114}{400} = 0.285$$

ESTIMATION GAME

- You will be competing against your table.
- I will show you a fraction. In your head, come up with an estimate for the decimal value of that fraction. Write down your estimate.
- You will not get much time – maybe 15-20 seconds per fraction.
- Whoever at the table has the closest estimate gets a point. Most points wins! The prize is you get to feel proud of yourself.

ESTIMATION

- Which is the best approximation for $\frac{46}{80}$?

A) 0.3 B) 0.6 C) 0.9 D) 2.1

Less than one, a little bit more than half: B

- What is a good approximation for $\frac{4381}{3567}$?

A) 0.7 B) 1.2 C) 1.8 D) 2.6

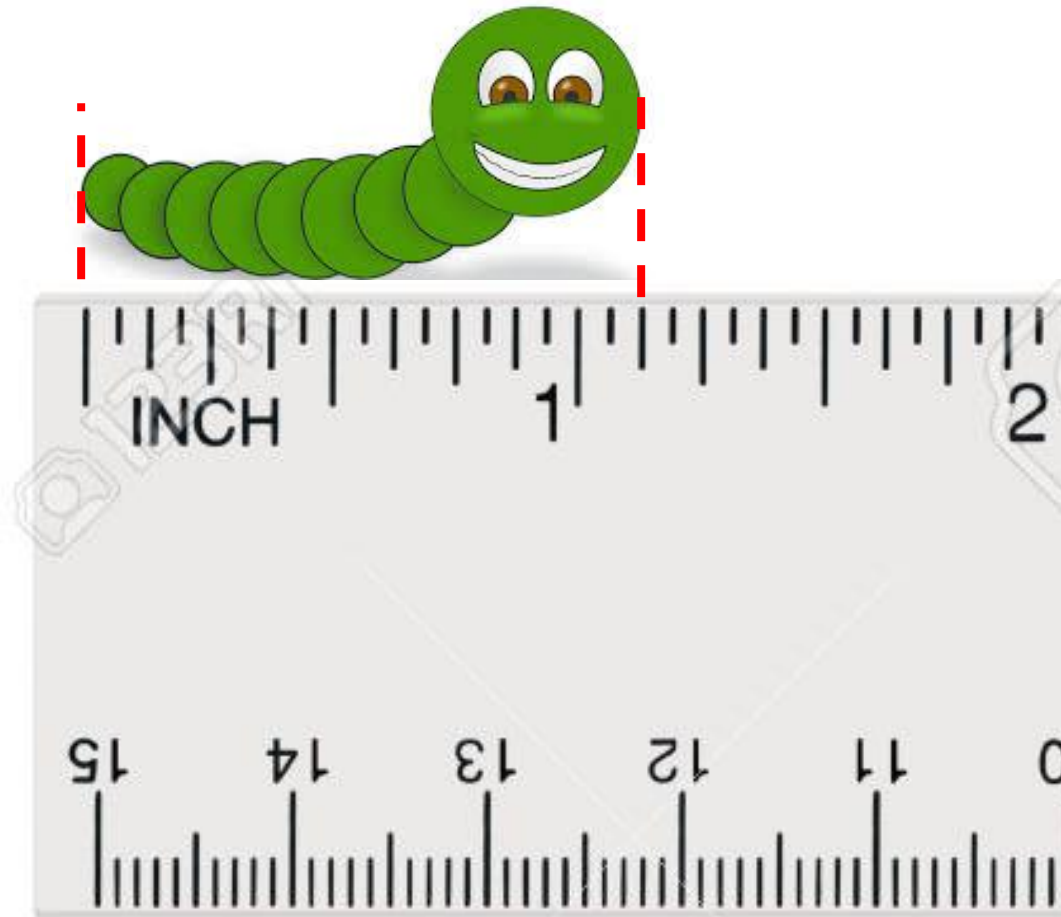
More than 1, definitely less than 1.5: B

Estimation Game

	<u>Estimate</u>	<u>Real Answer</u>
1) $\frac{4}{11}$	(your estimates vary)	$0.\overline{36}$
2) $\frac{68}{120}$		$0.5\overline{7}$
3) $\frac{10}{38}$		≈ 0.263
4) $\frac{43}{30}$		$1.4\overline{3}$
5) $\frac{607}{818}$		≈ 0.742

Last thing...

- How many inches is this caterpillar???
(BE PRECISE!)



Homework

- p.11 (1 – 15 all)