MATH DOESN'T SUCK

Solution Guide – Chapter 14

Mixing Fractions, Decimals, and Percents Together

Doing the Math from p. 180

2. $\frac{0.72}{9} = ?$

To change it to decimal, we can tip it over and divide: $9\overline{)0.72}$ $\mathbf{0.08}$

To make $\frac{0.72}{9}$ into a percent, let's just convert 0.08 into a percent, since they're equal:
So we move the decimal point to the right two places, and add a % sign: 0.08 = **8%.**

And to make $\frac{0.72}{9}$ a "nice fraction", we need to get rid of decimal **two** places, so let's multiply top and bottom by 1**00** to do that: $\frac{0.72 \times \mathbf{100}}{9 \times \mathbf{100}} = \frac{72}{900}$ and *now* we can reduce!

You probably recognize that the top and bottom both have "9" as a factor:

$\frac{72 \div \mathbf{9}}{900 \div \mathbf{9}} = \frac{8}{100}$. And we can keep reducing… $\frac{8 \div \mathbf{4}}{100 \div \mathbf{4}} = \frac{2}{25}$.

Answer: $\frac{0.72}{9} = \frac{\mathbf{2}}{\mathbf{25}}$**, 0.08** and **8%.**

3. $\frac{0.1}{0.02} = ?$

Let's use the fraction method of dealing with this. It's actually easier: For $\frac{0.1}{0.02}$, we need to move the decimal point **two** places to get rid of it, so we can use 100 on top and bottom: $\frac{0.1 \times \mathbf{100}}{0.02 \times \mathbf{100}} = \frac{10}{2}$ now reduce: $\frac{10 \div \mathbf{2}}{2 \div \mathbf{2}} = \frac{5}{1} = \mathbf{5}$. Actually, we've just figured out the fraction and the decimal form! All that remains is the percent. Just look at 5 and move the decimal two places to the *right* and add a % sign: 5 = **500%**

Answer: $\frac{0.1}{0.02} = \mathbf{5}, \frac{\mathbf{5}}{\mathbf{1}}$, **500%**

4) $\frac{\frac{1}{2} + 0.4}{1\frac{1}{2} - 0.3} = ?$

First let's simplify the numerator by converting $\frac{1}{2}$ to a decimal, by tipping it over and dividing to get 0.5. So the numerator becomes 0.5 + 0.4 = **0.9**

Now let's attack the denominator. Since $\frac{1}{2}$ = 0.5, then $1\frac{1}{2}$ = 1.5 . So the denominator becomes 1.5 – 0.3 = **1.2**. Let's put our fraction together: $\frac{0.9}{1.2}$

If you want a decimal answer, then it's time to tip over the fraction and divide: $1.2\overline{)0.9}$ We need to get rid of the decimal in the divisor, so we'll move the decimal point one place in the divisor *and* dividend: $1.2\overline{)0.9} = 12\overline{)9}$ After a little bit of decimal division, we get: $12\overline{)\mathbf{0.75}}$ 9.00

Then for the percent, just take 0.75, move the decimal point two places to the *right* and add a % sign: 0.75 = **75%**

To get its "simple" fraction form, we could look at $\frac{0.9}{1.2}$, and to get rid of the decimal, we'd multiply top and bottom by 10: $\frac{0.9 \times \mathbf{10}}{1.2 \times \mathbf{10}} = \frac{9}{12}$ and now reduce: $\frac{9 \div \mathbf{3}}{12 \div \mathbf{3}} = \frac{\mathbf{3}}{\mathbf{4}}$

You also could have started like this, and then turned $\frac{3}{4}$ into a decimal and percent; you'd get the same answer, of course.

There are lots of strategies to solving these, you can do them however seems easiest to you!

Answer: $\frac{\frac{1}{2}+0.4}{1\frac{1}{2}-0.3} = \mathbf{\frac{3}{4}}$, **0.75,** and **75%**

5) 2.5% = ?

So we already have its percent form; what's its decimal form? Just move the decimal point two places to the left and take away the % sign: 2.5% = **0.025**

For the fraction form of 2.5%, remember from p.168 that whatever comes before the % sign, is actually a fraction's numerator, with a denominator of 100! It's like the little "%" actually stands for the little fraction line and the two zeros…

2.5% = $\frac{2.5}{100}$

But of course, we want to now get rid of the decimal point in the fraction, so let's multiply top and bottom by 10:

$\frac{2.5 \times \mathbf{10}}{100 \times \mathbf{10}} = \frac{25}{1000}$

And now let's reduce it: $\frac{25 \div \mathbf{25}}{1000 \div \mathbf{25}} = \frac{1}{40}$

Finally, a fraction that looks "nice"!

Answer: 2.5% = **2.5%, 0.025,** $\mathbf{\frac{1}{40}}$

6) 0.4% = ?

Again, we already have the percent form. What's its decimal form? Just move the decimal point two places to the left and take away the % sign: 0.4% = **0.004**

For a percent's fraction form, we remember that we can just take whatever is before the % sign and put it over a fraction with 100 as the denominator; it's what the % sign means! So: 0.4% = $\frac{0.4}{100}$

And now let's get rid of the decimal point in the numerator by multiplying top and bottom by 10:

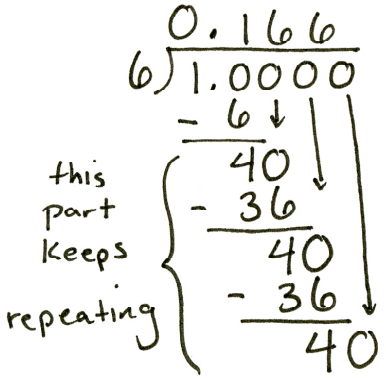
$\frac{0.4 \times \mathbf{10}}{100 \times \mathbf{10}} = \frac{4}{1000}$, and now reduce: $\frac{4 \div \mathbf{4}}{1000 \div \mathbf{4}} = \frac{1}{250}$

Answer: 0.4% = **0.4%, 0.004** and $\mathbf{\frac{1}{250}}$

Doing the Math from p. 181-2

2) $\frac{1}{6}$, 0.19, 16%

Let's turn them all into decimals. Starting with $\frac{1}{6}$, let's tip it over and divide: $6\overline{)1.000}$



…and we get $\mathbf{0.1\overline{6}}$.

Next, let's convert 16% to a decimal: Drop the % and move the decimal 2 places to the *left*: 16% = **0.16**

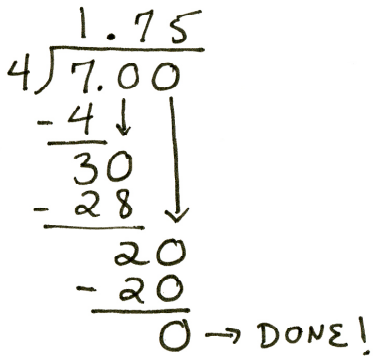
It's clear that **0.19** is bigger than 0.16 and $0.1\overline{6}$, but how do these last two compare?

Well, $0.1\overline{6}$ = 0.1666666… so when you compare it to 0.16,
(just think of the fact that 0.16 = 0.160), we can see that $0.1\overline{6}$ is the bigger one.

Answer: from least to greatest: 16%, $\frac{1}{6}$, 0.19

3) $\frac{7}{4}$, 200%, $1\frac{4}{5}$

Let's convert them all to decimals. Tip and divide: $\frac{7}{4}$ → $4\overline{)7.00}$



So, $\frac{7}{4}$ = **1.75**

Next, we'll convert 200% to a decimal: Drop the % and move decimal two places to the *left*: 200% = **2**

Thirdly, let's convert $1\frac{4}{5}$. Just looking at $\frac{4}{5}$ for now, let's tip it over and divide: $5\overline{)4.0}^{0.8}$

So $1\frac{4}{5}$ = 1 + 0.8 = **1.8**

So now all we have to do is compare **1.75**, **2**, and **1.8**. No problem!

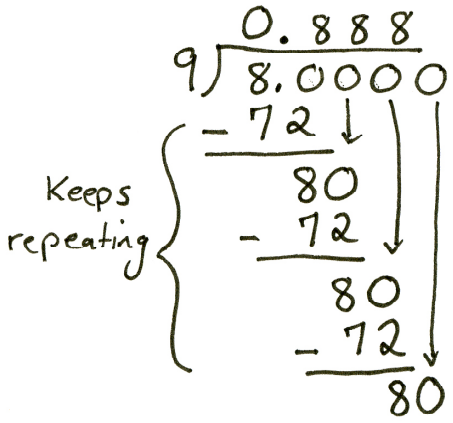
Answer: in order from least to greatest: $\frac{7}{4}$, $1\frac{4}{5}$, 200%

4) 0.889, 89%, $\frac{8}{9}$

The first one is already a decimal.

To make 89% a decimal, just drop the % and move the decimal two places to the left: 89% = **0.89**.

Finally, tip over the fraction and divide: $\frac{8}{9} \rightarrow 9\overline{)8.000}$



Now we just need to compare **0.889**, **0.89**, and $\mathbf{0.\overline{8}}$.

Since in the last one, the 8's go forever, we know that $0.\overline{8}$ is smaller than 0.889 (at the third digit that we compare, the .889 beats the .88888…. and remember, once one digit beats the other, we can stop! See p.117 for a review of this.)

And we're done!

Answer: in order from least to greatest: $\frac{8}{9}$, 0.889, 89%