


# MATH DOESN'T SUCK



## Solution Guide – Chapter 11

### Converting Fractions and Mixed Numbers to Decimals

#### Doing the Math from p. 140

2)  $\frac{2}{5} = ?$

Tip it over and divide:  $\frac{2}{5} = 5 \overline{)2}$

In order to divide, now let's add a decimal point and a **zero**:  $5 \overline{)2.0}$

Put the decimal point *directly* above, and divide normally, “ignoring” the decimal points, now that they are all in the right places:

$$\begin{array}{r} 0.4 \\ 5 \overline{)2.0} \\ \underline{-20} \\ 0 \rightarrow \text{DONE!} \end{array}$$

Answer:  $\frac{2}{5} = 0.4$

3)  $\frac{1}{8} = ?$

Tip over to divide, and add a decimal point and a few zeros:  $\frac{1}{8} = 8 \overline{)1.00}$

$$\begin{array}{r} 0.12 \\ 8 \overline{)1.00} \\ \underline{-8} \downarrow \\ 20 \\ \underline{-16} \\ 4 \rightarrow \text{NOT DONE YET!} \end{array}$$

And it looks like we need one extra zero; that's okay, we can always add another one after the decimal point:  $8 \overline{)1.000}$

$$\begin{array}{r} 0.125 \\ 8 \overline{)1.000} \\ \underline{-8} \downarrow \\ 20 \downarrow \\ \underline{-16} \downarrow \\ 40 \\ \underline{-40} \\ 0 \rightarrow \text{DONE!} \end{array}$$

Answer:  $\frac{1}{8} = 0.125$

4)  $\frac{6}{4} = ?$

Tip over and divide, adding a decimal point and zeros:  $\frac{6}{4} = 4 \overline{)6.00}$

$$\begin{array}{r} 1.5 \\ 4 \overline{)6.00} \\ \underline{-4} \phantom{0} \downarrow \\ 20 \\ \underline{-20} \\ 0 \end{array}$$

It looks like we didn't need that second zero we added, but that's okay, it didn't hurt us to add it! Better safe than sorry, eh?

**Answer:**  $\frac{6}{4} = 1.5$

(Also notice that we could have reduced  $\frac{6}{4} = \frac{3}{2}$ , and solved  $2 \overline{)3}$  - we would have gotten the same answer!)

### Doing the Math from p. 142

2)  $1\frac{1}{5}$

Remember that  $1\frac{1}{5} = 1 + \frac{1}{5}$ , so our strategy will be to first convert  $\frac{1}{5}$  to a decimal, and then add it to the 1.

We'll tip it over and divide:  $\frac{1}{5} = 5 \overline{)1.0}$

Then  $1\frac{1}{5} = 1 + 0.2 = 1.2$

**Answer:**  $1\frac{1}{5} = 1.2$

3)  $2\frac{3}{4} = ?$

Since  $2\frac{3}{4} = 2 + \frac{3}{4}$ , first we'll deal with the  $\frac{3}{4}$ , and add it to "2" at the end.

Tip over and divide:  $4 \overline{)3.00}$ , so  $\frac{3}{4} = 0.75$

Which means that:  $2\frac{3}{4} = 2 + 0.75 = 2.75$ . Voila!

**Answer:**  $2\frac{3}{4} = 2.75$

4)  $3\frac{1}{2} = ?$

Let's just deal with the  $\frac{1}{2}$  to begin:

Tip over and divide (though you probably know this one already)  $\frac{1}{2} = 2 \overline{)1.0}$ ,

so  $3\frac{1}{2} = 3 + \frac{1}{2} = 3 + 0.5 = 3.5$ .

Not so bad, eh?

**Answer:**  $3\frac{1}{2} = 3.5$

## Doing the Math from p. 146

2)  $\frac{4}{15} = ?$

The fraction's already reduced, so let's tip over and divide, remembering to add some

zeros, in case we need them:  $15 \overline{)4.00}$

Handwritten long division of 4.0000 by 15. The quotient is 0.2666. The division shows that after the first two digits (0.26), the remainder is 100, which is then divided by 15 to get 6 with a remainder of 100, repeating the process. A bracket on the left side of the division indicates that the '6' repeats. Arrows point from the '6's in the quotient down to the corresponding '6's in the remainder steps.

Since the 6 repeats, we can just put a bar over it and be done with it!

**Answer:**  $\frac{4}{15} = 0.2\bar{6}$

3)  $\frac{6}{15} = ?$

We can reduce this, since 3 is a factor of both 6 and 15:  $\frac{6}{15} = \frac{6 \div 3}{15 \div 3} = \frac{2}{5}$

Now let's tip over and divide:  $\frac{2}{5} = 5 \overline{)2.0}$

This one didn't repeat, so no little "bar" necessary!

**Answer:**  $\frac{6}{15} = 0.4$

4)  $\frac{23}{33} = ?$

This one doesn't reduce, so let's go ahead and tip over and divide:  $33 \overline{)23.0000}$

	<u>0.6969</u>	
33	$\overline{)23.00000}$ $\underline{-198}$ $320$ $\underline{-297}$ $230$ $\underline{-198}$ $320$ $\underline{-297}$ $230$	scratch work:  $\begin{array}{r} ^1 33 \\ \times 6 \\ \hline 198 \end{array}$  $\begin{array}{r} ^2 33 \\ \times 9 \\ \hline 297 \end{array}$

Since the 69 repeats, that's what we put a bar over.

Answer:  $\frac{23}{33} = 0.\overline{69}$

5)  $1\frac{1}{9} = ?$

We could split this up into its parts, since  $1\frac{1}{9} = 1 + \frac{1}{9}$ , but since it's such an easy MAD face (see p.45), I'll go ahead and convert it into an improper fraction:  $1\frac{1}{9} = \frac{10}{9}$ . Now

let's tip over and divide:  $\frac{10}{9} = 9 \overline{)10.00}$

$$\begin{array}{r} 1.11 \\ 9 \overline{)10.00} \\ \underline{-9} \phantom{00} \phantom{00} \\ 10 \phantom{00} \phantom{00} \\ \underline{-9} \phantom{00} \phantom{00} \\ 10 \phantom{00} \phantom{00} \\ \underline{-9} \phantom{00} \phantom{00} \\ 10 \phantom{00} \phantom{00} \\ \underline{-9} \phantom{00} \phantom{00} \end{array}$$

keeps repeating

Since the 1 keeps repeating, we can put a bar over it. Done!

Answer:  $1\frac{1}{9} = 1.\overline{1}$