Mini-Test 1 on Friday, September 16

on WS 1-1 to 1-4 PLUS homework and handouts.

Don't forget to check out class website:

www.ghcimpm1d.weebly.com

Worksheet 1-3: Fractions

Fraction means division.
You divide the numerator by the denominator.

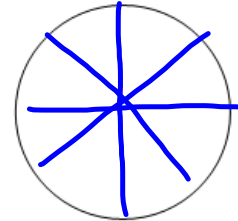$\dfrac{1}{8}$ $\dfrac{2}{\boxed{8}}$ $\dfrac{3}{8}$

$\dfrac{1}{8}$ is a fraction. It means divide 1 by 8.

1 is the <u>numerator</u>. 1 is the number above the division line (top number).
8 is the denominator. 8 is the number under the division line (bottom number).

How do you share this pizza with your 7 friends? Please be fair!

Write a fraction to represent your share of the pizza. $\dfrac{1}{8}$

Rules for Adding and Subtracting Fractions

You can only add and subtract fractions with the SAME denominators.

1. **When the denominators are the same,**
    <u>add/subtract</u> the top numbers and keep the bottom number.

2. **When the denominators are not the same (DIFFERENT),**
    <u>change</u> the fractions into equivalent fractions with the SAME denominator (LCD).
    Then add/subtract the top numbers and keep the LCD (Lowest Common Denominator)

Practice:

1. (a) $\dfrac{1}{5}+\dfrac{3}{5}$ (b) $-\dfrac{7}{8}-\dfrac{5}{8}$ (c) $\dfrac{2}{3}+\dfrac{5}{9}$ LCD=9   (d) $-\dfrac{5}{6}+\dfrac{1}{4}$ LCD=12

(a)
$$=\dfrac{1+3}{5} \checkmark$$
$$=\dfrac{4}{5} \checkmark$$

2 steps
1 mark

(b)
$$=\dfrac{-7-5}{8} \checkmark$$
$$=-\dfrac{12 \div 4}{8 \div 4} \checkmark$$
$$=-\dfrac{3}{2} \checkmark$$
$$=-1\dfrac{1}{2} \checkmark$$

$2\overline{)3}$ → $\dfrac{1}{2\overline{)3}}\; \dfrac{2}{1}$

4 steps
3 marks

(c)
$$=\dfrac{6}{9}+\dfrac{5}{9} \checkmark$$
$$=\dfrac{6+5}{9} \checkmark$$
$$=\dfrac{11}{9} \checkmark$$
$$=1\dfrac{2}{9} \checkmark$$

$9\overline{)11}\;\dfrac{1}{9}\;\dfrac{2}{}$

4 steps
3 marks

(d)
$$=-\dfrac{10}{12}+\dfrac{3}{12} \checkmark$$
$$=\dfrac{-10+3}{12} \checkmark$$
$$=-\dfrac{7}{12} \checkmark$$

$-\dfrac{-10+3}{12}$

3 steps
2 marks

Fractions you'll see in high school math:

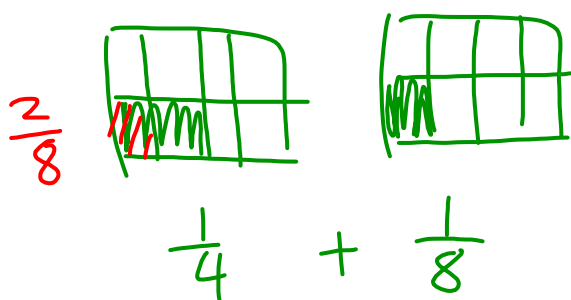$$\frac{2}{3}$$

$$\frac{25}{108}$$

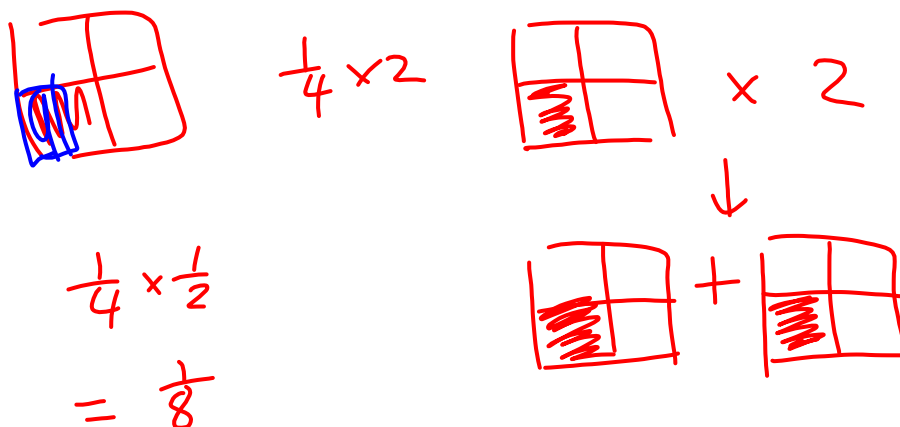$$\frac{x}{2}$$

$$\frac{x}{2} + 3x = 5$$

$$\frac{x^2 + 2x + 1}{x + 1} + \frac{x^2 - 2x + 1}{x - 1}$$

Why do we need same denominators when adding/subtracting fractions?

The size or dimension must be the same or we cannot combine them!

$$\frac{2}{8}$$

$$\frac{1}{4} \; + \; \frac{1}{8}$$

No need to have the same denominator when multiplying or dividing!

$$\frac{1}{4} \times 2$$

$$\times \; 2$$

$$\frac{1}{4} \times \frac{1}{2}$$

$$= \frac{1}{8}$$

<u>Rules for Adding and Subtracting Proper Fractions with Whole Number</u>

1. Change the proper fractions into improper fractions;

   you multiply the bottom number to the whole number and add it to the top number.

2. Follow steps for adding/subtracting fractions.

3. Write your answer as a proper fraction with whole number by dividing the top number by the bottom number. (Remember fraction means division)

4. The quotient is the whole number of the fraction.
   The divisor is the denominator.
   The reminder is the numerator.

Practice:

2. (a) $2\dfrac{1}{6} + 1\dfrac{1}{6}$ (b) $4\dfrac{3}{5} - 3\dfrac{4}{5}$

$$= \frac{13}{6} + \frac{7}{6} \qquad\qquad = \frac{23}{5} - \frac{19}{5}$$

$$= \frac{13+7}{6} \qquad\qquad = \frac{23-19}{5}$$

$$= \frac{20}{6} \qquad \boxed{6\overline{\smash{\big)}\,\begin{array}{r}3\\20\\-18\\\hline 2\end{array}}} \qquad = \frac{4}{5}$$

$$= 3\frac{2}{6} \overset{\div 2}{\underset{\div 2}{}}$$

$$= 3\frac{1}{3}$$

(c) $-1\dfrac{4}{5} + 3\dfrac{1}{2}$ LCD = 10   (d) $-2\dfrac{1}{4} - 1\dfrac{3}{8}$ LCD = 8

$$= -\frac{9}{5}^{\times 2}_{\times 2} + \frac{7}{2}^{\times 5}_{\times 5} \qquad = -\frac{9}{4}^{\times 2}_{\times 2} - \frac{11}{8}$$

$$= -\frac{18}{10} + \frac{35}{10} \qquad\qquad = -\frac{18}{8} - \frac{11}{8}$$

$$= \frac{-18+35}{10} \qquad\qquad = \frac{-18-11}{8}$$

$$= \frac{17}{10} \qquad\qquad\qquad = \frac{-29}{8}$$

$$= 1\frac{7}{10} \qquad\qquad\qquad = -3\frac{5}{8}$$

Multiplying Fractions

Always change mixed fractions to improper fractions

Method 1

1. Multiply the top numbers
2. Multiply the bottom numbers
3. Reduce the fraction to the lowest terms

Method 2

1. Divide evenly the top number and the bottom number by the same divisor at the same time until you cannot divide any more (reducing)

Practice:

3. (a) $\dfrac{3}{4} \times \dfrac{4}{9} = \dfrac{1}{3}$

$$= \dfrac{3 \times 4}{4 \times 9}$$

$$= \dfrac{12 \div 12}{36 \div 12}$$

$$= \dfrac{1}{3}$$

(b) $\dfrac{5}{7} \times -\dfrac{1}{10} = -\dfrac{1}{14}$

$$= -\dfrac{5 \times 1}{7 \times 10}$$

$$= -\dfrac{5 \div 5}{70 \div 5}$$

$$= -\dfrac{1}{14}$$

(c) $\dfrac{3}{14} \times 2\dfrac{1}{3}$

$$= \dfrac{3}{14} \times \dfrac{7}{3} = \dfrac{1}{2}$$

$$= \dfrac{3 \times 7}{14 \times 3}$$

$$= \dfrac{21 \div 21}{42 \div 21}$$

$$= \dfrac{1}{2}$$

(d) $-4 \times -\dfrac{9}{16}$

$$= -\dfrac{4 \times -9}{1 \times 16}$$

$$= \dfrac{36 \div 4}{16 \div 4}$$

$$= \dfrac{9}{4}$$

$$= 2\dfrac{1}{4}$$

$-\times- \rightarrow +$

$+\times+ \rightarrow +$ same

$+\times- \rightarrow -$

$-\times+ \rightarrow -$ different

Dividing Fractions

$$10 \div 2 \rightarrow 10 \times \frac{1}{2} = 5$$

1. Change the "÷" sign to "×" sign
2. Flip the divisor or the second fraction over (Write the reciprocal of the divisor)
3. Follow steps for multiplying fractions

Practice:

4. (a) $\frac{3}{4} \div \frac{2}{7}$

$$= \frac{3}{4} \times \frac{7}{2}$$

$$= \frac{21}{8}$$

$$= 2\frac{5}{8}$$

(b) $\frac{9}{11} \div -\frac{3}{4}$

$$= \frac{9}{11} \times -\frac{4}{3}$$

$$= -\frac{36}{33}$$

$$= -1\frac{3}{33}$$

$$= -1\frac{1}{11}$$

(c) $-2\frac{1}{3} \div -4\frac{2}{3}$

$$= -\frac{7}{3} \div -\frac{14}{3}$$

$$= -\frac{7}{3} \times -\frac{3}{14}_2$$

$$= \frac{1}{2}$$

(d) $15 \div 1\frac{2}{3}$

$$= \frac{15}{1} \div \frac{5}{3}$$

$$= 15^3 \times \frac{3}{5}$$

$$= 9$$

$+/-$ **WS 1-4. <u>Fractions</u>**

1. During a power outage caused by a thunderstorm, Beverley lit a small candle to provide light. The candle burned for ½ hour, then went out. She then lit a second candle which burned for another ¾ hour. For how long was there candlelight in the house?

$$\text{Time} = \frac{1}{2} + \frac{3}{4}$$

$$= \qquad \therefore \text{ It lit for } \underline{1\frac{1}{4}} \text{ hours.}$$

2. A carpenter's helper had 4 bags of nails on the shelf. These bags of nails weighed as follows: ¼ lb, ½ lb, ⅔ lb, and ¾ lb. What was the combined weight of the bags of nails?

3. Eloise took her ill-tempered dog to dog obedience school to try to improve his behavior. The dog attended one session for ¾ of an hour and a second session for ⅙ of an hour. At that point, the dog began chewing up the instructor's rug and was suspended. How much time was the dog in school before becoming an obedience school dropout?

4. Two Boy Scouts were hiking along a trail in the mountains. On the first day they walked 9½ kilometers. On the second day they walked 12⅓ kilometers. How much farther did they walk on the second day than the first?

5. During a football game there was a heavy wind. It was hard to punt (kick) the ball against the wind. Punts made with the wind averaged 50¾ yards. Punts made against the wind averaged 34¾ yards. What was the difference in yardage between punts made with the wind and against the wind?

6. In 1992, a stock sold for 22¼ dollars. In 1996, the same stock sold for 24½ dollars. How much had the stock gained in value?

7. A scientist, who used only a paper and pencil, did some calculating in 5 *whole* seconds. His assistant, who used a computer, did the same problem in ¹⁄₁₀,₀₀₀ *of that time.* How long did it take his assistant who used the computer as a tool in helping do the problem?

| Find *Part* of the Whole → *Multiply* |
| Find *Whole* of the Part → *Divide* |

$$5 \times \frac{1}{10000}$$

10. *Part Value* $= \frac{1}{3}$m One third of a meter of snow fell in January. If this was ⅕ *fraction* of the total snow- *whole* fall for the winter, how many meters of snow fell that winter?

$$\frac{1}{3} \div \frac{1}{5}$$

Check:

One night Jack didn't sleep well, because he was taking a trip in the morning and was very excited about it. He slept for 4½ hours. This was only ³⁄₅ *whole* the amount of time he usually slept. How many hours did Jack usually sleep?

① Part or (whole) ÷

② steps $4\frac{1}{2} \div \frac{3}{5}$

③ Answer $= \frac{9}{2}^{3} \times \frac{5}{3}$ OR $= \frac{15}{2}$

$$= \frac{45}{6} \qquad = 7\frac{1}{2}$$

$$= 7\frac{1}{2}$$

∴ He usually sleeps $7\frac{1}{2}$ hrs.

1

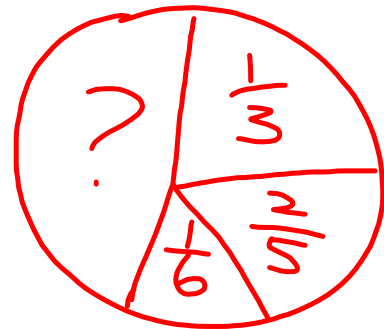$$\frac{-2^{\times 3}}{3_{\times 5}} + \frac{-4^{\times 3}}{5_{\times 3}} = \frac{-10}{15} + \left(-\frac{12}{15}\right)$$

LCD = 15

$$= \frac{-10 + (-12)}{15} = \frac{-10 - 12}{15}$$

$$= -\frac{22}{15}$$

$$= -1\frac{7}{15}$$

10 UFO Industries makes $\frac{1}{3}$ of the world's widgets. IOU Corporation makes $\frac{2}{5}$ of the world's widgets. DDT Enterprises makes $\frac{1}{6}$. What fraction is made by other companies?

Whole is always "1".

$$1 - \frac{1}{3} - \frac{2}{5} - \frac{1}{6}$$

$\frac{3}{4}$ h   value ⇒ time on homework

9. Gordon spent ¾ of an hour doing some of his homework. He spent ⅔ of his time studying math and the rest of the time studying history. How much time did he spend studying math?

$\frac{3}{4} \times \frac{2}{3}$

Value × fraction
= Part value

Puzzle Handout:

#4

$\frac{5}{8}$ miles

1 km

How many $\frac{5}{8}$ miles is in $2\frac{3}{4}$ miles? ⟶ Divide

$2\frac{3}{4}$ miles

Similarly:

A toy costs $1.25

How many toys can be bought with $12.50?

How many $1.25 is in $12.50?

Division!!!