

No HW! Yay!

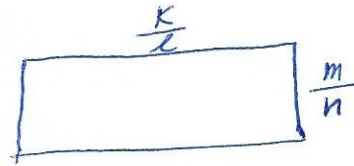
10/30/18

Ch. 17: Multiplication of fractions

Def'n:

If  $\frac{m}{n}$  and  $\frac{k}{l}$  are fractions then,

$\frac{m}{n} \times \frac{k}{l} \stackrel{\text{def}}{=} \text{the area of a rectangle}$   
 with side lengths  $\frac{m}{n}$  and  $\frac{k}{l}$ .



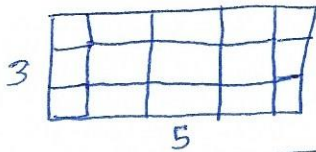
★ This agrees with our definition of whole # multiplication! ★

Ex. |  $3 \times 5 = 5 + 5 + 5$

Since whole #'s are special case fractions.

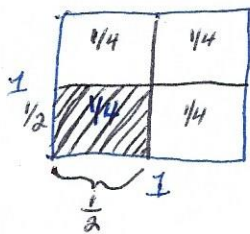
Ex. |

$\frac{3}{1} \times \frac{5}{1}$  is the area of a  $3 \times 5$  rectangle.



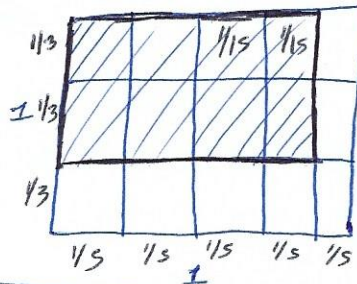
Ex. |  $\frac{1}{2} \times \frac{1}{2}$  is what?

Start with a  $1 \times 1$  square:



Ex. |  $\frac{2}{3} \times \frac{4}{5}$

Start w/  $1 \times 1$  square

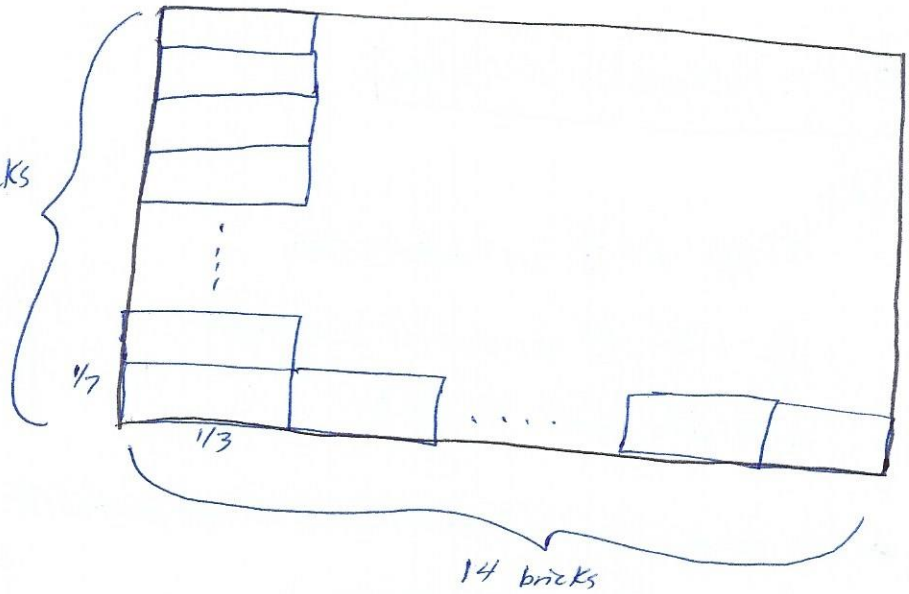
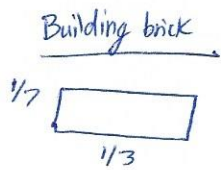


The total area of the black rectangle is  $(\frac{1}{15} + \frac{1}{15} + \frac{1}{15} + \dots + \frac{1}{15})$

$= \frac{8}{15} = \frac{2 \times 4}{3 \times 5}$  (8 times)

Ex. What is  $\frac{14}{7} \times \frac{14}{3}$ ?

Since we don't immediately know how many IX squares to use, let's use a  $\frac{1}{7} \times \frac{1}{3}$  rectangle first.



Area of black rectangle?

The area of each brick is  $\frac{1}{21}$ , so, we are on the sequence of 21st's

$$\frac{14 \times 14}{7 \times 3}$$

$$\begin{array}{r} 1.254 \\ \times 30.19 \\ \hline 37.85826 \end{array}$$

$$\begin{aligned} 1.254 \times 30.19 &= \frac{1254}{1000} \times \frac{3019}{100} = \frac{1254}{10^3} \times \frac{3019}{10^2} = \frac{1254 \times 3019}{10^3 \times 10^2} \\ &= \frac{1254 \times 3019}{10^{3+2}} = \frac{1254 \times 3019}{10^5} \end{aligned}$$

Multiply as if there isn't a decimal and add the decimal afterwards.

### Exam 3

- Def'n of fraction Ex. Def'n of  $\frac{1}{5}$ ; Start at 0 and take 7 steps of length  $\frac{1}{5}$   
— or —  
7 steps on the sequence of 5th's.
- Def'n of decimal + decimal fraction Ex. 30.19 is notation for  $\frac{3019}{100}$
- The unit
- Equivalent fractions
- adding + subtracting fractions + decimals Ex.  $1.9 + \frac{1}{4}$
- multiplication + division base 12.

Let's count with the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, ♡, ◇. Here is a grid to help:

00	01	02	03	04	05	06	07	08	09	0♡	0◇
10	11	12	13	14	15	16	17	18	19	1♡	1◇ 23
20	21	22	23	24	25	26	27	28	29	2♡	2◇
30	31	32	33	34	35	36	37	38	39	3♡	3◇
40	41	42	43	44	45	46	47	48	49	4♡	4◇
50	51	52	53	54	55	56	57	58	59	5♡	5◇
60	61	62	63	64	65	66	67	68	69	6♡	6◇
70	71	72	73	74	75	76	77	78	79	7♡	7◇
80	81	82	83	84	85	86	87	88	89	8♡	8◇
90	91	92	93	94	95	96	97	98	99	9♡	9◇
♡0	♡1	♡2	♡3	♡4	♡5	♡6	♡7	♡8	♡9	♡♡	♡◇
◇0	◇1	◇2	◇3	◇4	◇5	◇6	◇7	◇8	◇9	◇♡	◇◇ 143

Perform the long division

Multiples of 10:

- (1) 10
- (2) 30
- (3) 59
- (4) 78
- (5) 97
- (6) 06
- (7) 115
- (8) 134

$$\begin{array}{r}
 \phantom{10} \overline{0586731} \\
 10 \ ) \ \heartsuit \ \diamond \ 4 \ 7 \ \heartsuit \ \diamond \ \heartsuit \\
 \underline{-97} \ \downarrow \\
 \phantom{10} \ 144 \\
 \underline{-134} \ \downarrow \\
 \phantom{10} \ \cancel{0}107 \\
 \underline{-06} \ \downarrow \\
 \phantom{10} \ 11\heartsuit \\
 \underline{-115} \ \downarrow \\
 \phantom{10} \ 5\diamond \\
 \underline{-59} \ \downarrow \\
 \phantom{10} \ 2\heartsuit \\
 \underline{-10} \\
 \phantom{10} \ \cancel{\phantom{000000}} \\
 \phantom{10} \ \diamond
 \end{array}$$

$$\begin{array}{r}
 6 \\
 10 \\
 \times 7 \\
 \hline
 115
 \end{array}$$

$$\begin{array}{r}
 7 \\
 10 \\
 \times 8 \\
 \hline
 134
 \end{array}$$

So,  $\heartsuit\diamond 47\heartsuit\diamond\heartsuit = 586731 \times 10 + \diamond$

