

Some more practice questions:

1. Which equation matches each question (note, some equations may be used twice, and others not at all)

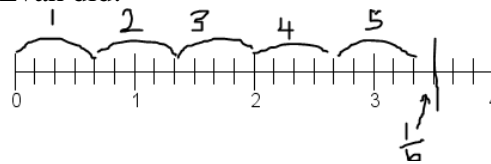
a. A full box of crackers holds $\frac{5}{4}$ lb of crackers. How many lbs of crackers is in $\frac{2}{3}$ of a box of crackers?	i. $\frac{5}{4} + \frac{2}{3}$
b. A full box of crackers holds $\frac{5}{4}$ lb of crackers. If my friends eat $\frac{2}{3}$ of the box, how many lbs of crackers be left?	ii. $\frac{5}{4} - \frac{2}{3}$
c. A full box of crackers holds $\frac{5}{4}$ lb of crackers. If my friends eat $\frac{2}{3}$ lb of crackers, how many lbs of crackers will be left?	iii. $\frac{5}{4} \times \frac{2}{3} = \frac{2}{3} \times \frac{5}{4}$
d. A full box of crackers holds $\frac{5}{4}$ lb of crackers. How many lbs of crackers is in 4 boxes of crackers?	iv. $\frac{5}{4} \div \frac{2}{3}$
e. A full box of crackers holds $\frac{5}{4}$ lb of crackers. If I have 4 lbs of crackers, how many boxes is that?	v. $\frac{2}{3} \div \frac{5}{4}$
f. A full box of crackers holds $\frac{5}{4}$ lb of crackers. If I have $\frac{2}{3}$ lbs of crackers, how many boxes is that?	vi. $4 \times \frac{5}{4} = \frac{5}{4} \times 4$
g. A full box of crackers holds $\frac{5}{4}$ lb of crackers. If I have a box of crackers and another $\frac{2}{3}$ of a box of crackers, how many lbs of crackers do I have?	vii. $4 \div \frac{5}{4}$
h. A full box of crackers holds $\frac{5}{4}$ lb of crackers. If I have a box of crackers and another $\frac{2}{3}$ lbs of crackers, how many lbs of crackers do I have?	viii. $\frac{5}{4} \div 4$
i. A blue box of crackers holds $\frac{5}{4}$ lb of crackers. A red box of crackers holds $\frac{2}{3}$ lbs of crackers. How many more lbs of crackers are in a blue box than a red box.	ix. $\frac{5}{4} + \left(\frac{5}{4} \times \frac{2}{3}\right)$
j. A blue box of crackers holds $\frac{5}{4}$ lbs of crackers. A red box holds $\frac{2}{3}$ as much as a blue box. How many more crackers are in a blue box than a red box?	x. $\frac{5}{4} - \left(\frac{5}{4} \times \frac{2}{3}\right)$

2. The question was: *How many bowls can you fill, if each bowl holds  $\frac{2}{3}$  cups of soup and you have  $3 \frac{1}{2}$  cups of soup?*

Doug did:

$$\frac{7}{2} \div \frac{2}{3} = \frac{21}{6} \times \frac{4}{6} = \frac{21}{4} = 5 \frac{1}{4}$$

Evan did:



Who is correct? What does the  $\frac{1}{4}$  mean in Doug's solution? (What is it  $\frac{1}{4}$  of) What does the  $\frac{1}{6}$  mean in Evan's solution? (what is it  $\frac{1}{6}$  of)

3. For the problem: Kelly had  $\frac{5}{6}$  of a cup of sugar. She used  $\frac{3}{4}$  of it to make a cake. How much sugar did she put in the cake?

a. Fill in the blanks to make an interpretation of the problem: \_\_\_\_ of a set of size \_\_\_\_.

b. Draw a diagram to solve the problem.

c. Write a number sentence to solve the problem.

d. Use the diagram to explain the multiplications in the number sentence algorithm (numerator and denominator)

Be prepared for problems like:

4. Write a word problem for:

a.  $\frac{5}{4} + \frac{2}{3}$       b&c.  $\frac{5}{4} - \frac{2}{3}$  (take away or compare)      d.  $\frac{5}{4} \times \frac{2}{3}$       e.  $4 \times \frac{5}{4}$       f.  $\frac{5}{4} \times 4$       g.  $\frac{5}{4} \div \frac{2}{3}$

5. Solve a word problem using a diagram (especially multiplication or division)

6. Explain a numerical solution from a diagram (standard multiplication algorithm or common denominator division algorithm)

Some answers:

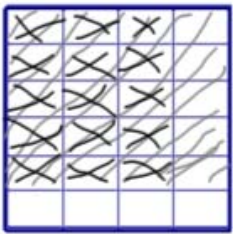
1a. iii.      b. x.      c. ii.      d. vi      e. vii      f. v.      g. ix      h. i.      i. ii.      j. x.

2. Doug's answer is more correct without additional labelling: you can fill  $5 \frac{1}{4}$  bowls of soup:  $\frac{1}{4}$  represents  $\frac{1}{4}$  of a bowl of soup. The  $\frac{1}{6}$  in Evan's solution means there are 5 bowls of soup and  $\frac{1}{6}$  of a cup of soup left over.

3. For the problem: Kelly had  $\frac{5}{6}$  of a cup of sugar. She used  $\frac{3}{4}$  of it to make a cake. How much sugar did she put in the cake?

a. Fill in the blanks to make an interpretation of the problem:  $\frac{3}{4}$  of a set of size  $\frac{5}{6}$ .

b. Draw a diagram to solve the problem.      c. Write a number sentence to solve the problem.



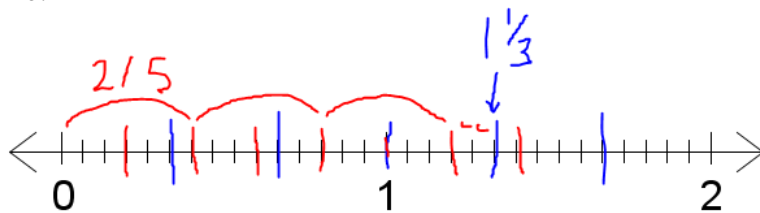
$$\frac{3}{4} \times \frac{5}{6} = \frac{3 \times 5}{4 \times 6} = \frac{15}{24} = \frac{5}{8}$$

d. Use the diagram to explain the multiplications in the number sentence algorithm (numerator and denominator)

Each of the 6ths in a whole cup is split into 4 parts, so there are  $4 \times 6$  parts in the whole (denominator)

In each of the 5 sixths that are shaded, 3 of the 4 parts are shaded again:  $3 \times 5$  parts are double shaded in the answer (numerator).

6. Division. For a division problem that is paraphrased as "how many  $\frac{2}{5}$  are in  $1 \frac{1}{3}$ " a diagram might look like:



In order to put  $\frac{2}{5}$  and  $1 \frac{1}{3}$  on the same number line, and get them in the right place, I had to make 15ths—a common denominator—and find the equivalent fractions with the common denominator:

$$\frac{2}{5} = \frac{2 \times 3}{5 \times 3} = \frac{6}{15} \quad \text{and} \quad 1 \frac{1}{3} = \frac{4 \times 5}{3 \times 5} = \frac{20}{15}$$

After I did that, I could make sets of  $\frac{2}{5} = \frac{6}{15}$  grouping the 20 small parts in  $\frac{20}{15}$  into groups of 6: which is

$20 \div 6$ . Then I have 3 sets and 2 fifteenth-sized parts left over, which is  $\frac{2}{6}$  of a set (6 make a whole set):

$$1 \frac{1}{3} \div \frac{2}{5} = \frac{20}{15} \div \frac{6}{15} = 20 \div 6 = \frac{20}{6} = 3 \frac{2}{6} = 3 \frac{1}{3}$$