Prompt: Create word problems using arithmetic operation on fractions. Create 5 easy, 5 moderate, 5 difficult problems.
Prompt2: Solve all these problems

Do these (write using pen; don't type) following the steps we described in class. Use variables to describe different parts of the problem, and the solution in terms of those variables (Eg: solution for problem 1) . And then compute the values. Include units of measurement in each step.

Easy

1. Sarah ate 1/4 of a pizza, and John ate 1/8 of the same pizza. What fraction of the pizza did they eat altogether?

   Amount Sarah ate X = ¼ pizza

   Amount John ate Y = ⅛ pizza

   Amount they both ate = X + Y =(¼ + ⅛) pizza = ⅝ pizza

   Fraction of pizza they ate = ⅝ of pizza, so fraction is ⅝

2. A recipe calls for 1/3 cup of sugar. If you want to make half the recipe, how much sugar do you need?

total sugar needed to make a recipe $x = \frac{1}{3}$ cup

~~recipe need to make = 1/2 cup~~

sugar needed in total $z = x * y$

$\frac{1}{3}$ cup

Amount of recipe we need to make = $y = \frac{1}{2}$ cup

$= (1/3) * (1/2)$ cup

$= \frac{1}{6}$ cup

3. Tom has 2/5 of a candy bar. He gives 1/5 of the candy bar to his friend. How much of the candy bar does Tom have left?

Tom candy bar $x = 2/5$ bar
Candy given to friend $y = 1/5$ bar
Candy bar tom has remaining, $z = x - y = (2/5) - (1/5) = 1/5$

$$z = x - y = \frac{2}{5}\text{bar} - \frac{1}{5}\text{bar}$$
$$= \left(\frac{2}{5} - \frac{1}{5}\right)\text{bar}$$
$$= \frac{1}{5}\text{bar}$$

4. A water bottle is 3/4 full. If you drink 1/4 of the water in the bottle, how much water is left?

Amount of water, $x = \frac{3}{4}$ bottle
filled water bottle $x = \frac{3}{4}$ water
drank water, $y = \frac{1}{4}$ water
$y = \frac{1}{4} \times x = \frac{1}{4} \times \frac{3}{4}\text{bottle} = \frac{3}{16}\text{bottle}$
water remaining $= x - y = (3/4) - (1/8) = \frac{24}{32}$ water
$z = x - y = \frac{3}{4}\text{bottle} - \frac{3}{16}\text{bottle} = \frac{12}{16} - \frac{3}{16} = \frac{9}{16}\text{bottle}$

$$\frac{3}{4} - \frac{1}{8} = \frac{3}{4} \times 1 - \frac{1}{8} \times 1 = \frac{3}{4} \times \frac{8}{8} - \frac{1}{8} \times \frac{4}{4} = \frac{3 \times 8 - 1 \times 3}{8 \times 4} = \frac{24}{32}\text{ water}$$

5. A garden is divided into 6 equal parts. If 1/6 of the garden is used for tomatoes and another 1/6 is used for peppers, what fraction of the garden is used for vegetables?

Tomatoes area, $x = \frac{1}{6}$ garden

Peppers area, $y = \frac{1}{6}$ garden

Total vegetable area

$z = x + y = \frac{1}{6}$ garden $+ \frac{1}{6}$ garden

$= \frac{2}{6}$ garden $= \frac{1}{3}$ garden

fraction 'f' of garden for vegetables $= \frac{1}{3}$ garden

$f \times$ garden $= \frac{1}{3} \times$ garden

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

Moderate

1. Mary walked 2 1/2 miles on Monday and 1 3/4 miles on Tuesday. How many miles did she walk in total?

Mary walked on Monday $x = 5/2$ miles

Mary walked on tuesday $y = 7/4$ miles

Mary walked in total $z = x + y = 5/2 + 7/4 = \frac{34}{8}$ miles

$\frac{5}{2} + \frac{7}{4} = \frac{5}{2} \times 1 + \frac{7}{4} \times 1 = \frac{5}{2} \times \frac{4}{4} + \frac{7}{4} \times \frac{1}{2} = \frac{5 \times 4 + 7 \times 2}{4 \times 2} = \frac{34}{8}$ miles

$= \frac{17}{4}$ miles $= 4\frac{1}{4}$ miles

2. A baker has 5 1/3 cups of flour. A recipe requires 2 2/3 cups of flour. How much flour will the baker have left after making the recipe?

flour baker has $x = \frac{16}{5}$ cup $= \frac{16}{3}$ cup

recipe needs flour $y = 8$ cup $= \frac{8}{3}$ cup

remaining flour after recipe $z = x - y = \frac{16}{3} - \frac{8}{3}$ cup $= \frac{8}{3}$ cup

$= 2\frac{2}{3}$ cup

(Don't skip steps

$5\frac{1}{3} = \frac{5 \times 3 + 1}{3} = \frac{16}{3}$)

3. John has 3/5 of an acre of land. He wants to divide it into 4 equal parts. What fraction of an acre will each part be?

land john has $x = 3/5$ acre

parts john divide $y = 4$ parts

fraction each part will be $z = \frac{x}{y} = \frac{3}{5} \div \frac{4}{1} = \frac{3}{20}$

$z = \frac{3}{5}$ acre $\div 4 = \frac{3}{20}$ acre

$\frac{3}{5} \div \frac{4}{1} = \frac{3}{5} \times \frac{1}{4} = \frac{3 \times 1}{5 \times 4} = \frac{3}{20}$

4. A paint can is 7/8 full. If you use 1/3 of the paint in the can, what fraction of the can will be left?

Paint can has $x = \frac{7}{8}$ can

paint used $y = \frac{7}{8} \times \frac{1}{3} = \frac{7 \times 1}{8 \times 3} = \frac{7}{24}$ can

paint left $= x - y = \frac{7}{8} - \frac{7}{24} = \frac{112}{192} = \frac{7}{12}$ can

$y = \frac{1}{3} \times x = \frac{1}{3} \times \frac{7}{8}$ can $= \frac{7}{24}$ can

$\frac{21}{24} - \frac{7}{24} = \frac{14}{24} = \frac{7}{12}$ can

$\frac{7}{8} - \frac{7}{24} = \frac{7}{8} \times 1 - \frac{7}{24} \times 1 = \frac{7}{8} \times \frac{24}{24} - \frac{7}{24} \times \frac{8}{8} = \frac{112}{168}$

$\frac{112}{192}$

$\times \frac{24}{7}$ $\quad \times \frac{24}{8}$ $\quad 168$

168 $\quad 192$ $\quad -56$

112

5. A construction team is building a road that is 10 miles long. They have completed 4 2/3 miles. How many more miles do they need to complete?

construction team road $x = 10$ miles

completed road $y = \frac{14}{3}$ miles $= 4\frac{2}{3} = \frac{4 \times 3 + 2}{3} = \frac{14}{3}$ miles

remaining road $z = x - y = 10 - \frac{14}{3} = \frac{16}{3}$ miles $= 5\frac{1}{3}$ miles

$\frac{10}{1} - \frac{14}{3} = \frac{10 \times 1}{1} - \frac{14}{3} \times 1 = \frac{10}{1} \times \frac{3}{3} - \frac{14}{3} \times \frac{1}{1}$

$= \frac{10 \times 3 - 14 \times 1}{3 \times 1} = \frac{16}{3}$

Difficult

1. A tank is 3/5 full of water. If 1/3 of the water is removed, what fraction of the tank is still full?

Amount of water in tank, $x = \frac{3}{5}$ tank

tank full $X = 3$ water

water removed $= y = \frac{1}{3}x$

water left $Z = y$

$x - y = x - \frac{1}{3}x = (1 - \frac{1}{3})x$

$= \frac{2}{3}x = \frac{2}{3} \times \frac{3}{5}$ tank

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

2. A recipe calls for 2 1/4 cups of flour and 1 1/2 cups of sugar. If you want to triple the recipe, how many cups of flour and sugar will you need in total?

3 times

Amount of flour for recipe, $X = 2\frac{1}{4}$ cup $= \frac{9}{4}$ cup

" " sugar " " , $Y = 1\frac{1}{2}$ cup $= \frac{3}{2}$ cup

3 times recipe will need $3X + 3Y$,

but X is flour & Y is sugar cups.

Flour needed $= 3X = 3 \times \frac{9}{4}$ cup $= \frac{27}{4}$ cup $= 6\frac{3}{4}$ cup

Sugar needed $= 3Y = 3 \times \frac{3}{2}$ cup $= \frac{9}{2}$ cup $= 4\frac{1}{2}$ cup

If they ask how much sugar & flour, we tell each seperately. Their units are 'cups of flour' and 'cups of sugar'. If they ask how many

cups of ingredients (cooking stuff) then we can add both and units will be 'cups of ingredients'
Like 3 apples + 4 oranges ≠ 7 apples but
3 apples + 4 oranges = 7 fruits.

3. A piece of wood is 8 1/2 feet long. It needs to be cut into pieces that are 1 1/4 feet long. How many pieces can be cut from the wood?

length
Wood feet $x = \frac{17}{2}$ feet

wood needed for each piece, $y = \frac{5}{4}$ feet

Pieces wood cut $= \frac{x}{y} = \frac{17}{2} \div \frac{5}{4}$

$= \frac{68}{10}$ $\frac{\text{feet}}{\text{feet}}$ $= \frac{34}{5} = 6\frac{4}{5}$

$\frac{17}{2} \div \frac{5}{4} = \frac{17}{2} \times \frac{4}{5} = \frac{17 \times 4}{2 \times 5} = \frac{68}{10}$

2
17
× 4
68

4. A farmer has 7/8 of his land planted. He plants 2/3 of the planted area with corn. What fraction of the total land is planted with corn?

Planted area, $x = \frac{7}{8}$ land

Corn area $= y = \frac{2}{3} \times x = \frac{2}{3} \times \frac{7}{8}$ land

$= \frac{14}{24}$ land

$= \frac{7}{12}$ land

So fraction of total land planted with corn $= \frac{7}{12}$

5. A group of students is working on a project. 1/4 of the students work on research, 2/5 work on design, and the rest work on testing. What fraction of the students work on testing?

Total students = X

Students on research, $Y = \frac{1}{4} \times X$

" " design, $Z = \frac{2}{5} \times X$

Rest are on testing, $T = X - Y - Z$

$= X - \frac{1}{4}X - \frac{2}{5}X$

$= \left(1 - \frac{1}{4} - \frac{2}{5}\right) \times X$

$= \frac{20-5-8}{20} X = \frac{7}{20} X$

fraction of students on testing $= \frac{7}{20}$.