

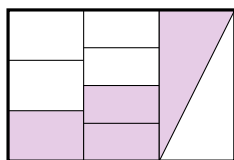
MATH 1135 REVIEW III

1. Multiplication of fractions.

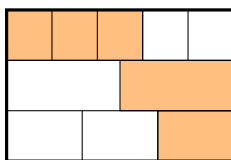
Use the meaning of multiplication and the meaning of fractions to explain why the following story problems can be solved by multiplication. In each case, clearly identify how the story problem relates to the meaning of multiplication, and draw an array diagram or other figure which supports your explanation. Then complete the arithmetic to answer the question.

- (a) A jar is $\frac{3}{4}$ full of water. The full jar holds 6 cups. How many cups of water are in the jar now?
- (b) Katie has 14 pumpkins, each weighing $1\frac{2}{3}$ pounds. What is the total weight of the pumpkins?
- (c) In a walk-a-thon, Donald walks $2\frac{2}{5}$ times as far as John. If John walks $1\frac{2}{5}$ miles, how far does Donald walk?

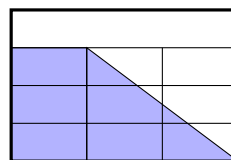
2. For each of the large rectangles below, use fraction multiplication and addition to write an expression for the shaded area of the box. Complete the arithmetic to find what fraction of the box's area is shaded. You may assume that lengths which appear to be equal really are equal.



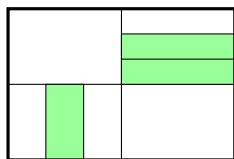
(a)



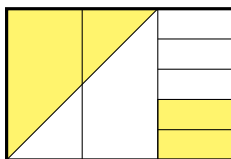
(b)



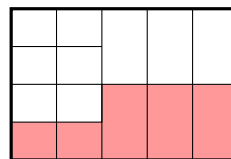
(c)



(d)



(e)



(f)

3. A student wants to compute 0.154×32.33 . Her friend finds that $154 \times 3233 = 497882$. Explain the following:

- (a) How many places should the student move the decimal point in order to get the answer she wants? What is the answer?
- (b) Why does moving the decimal point that many places give the correct answer? A complete answer should address place value and should use complete (correct) equations and sentences.

4. A division problem like $364 \div 7$ can be interpreted as a missing-factor multiplication problem in two ways, and these lead to the two main interpretations of division. Write down each of these missing-factor problems, and the corresponding interpretation of the meaning of division.

5. For each of the following stories, write whether it is a story for the “How many groups?” interpretation or the “How many in each group?” interpretation, or not a division problem at all. If it is a story about division, draw a box around the description of the “groups” for that story and write down the division problem, $A \div B$, that answers the question in the story.

- (a) A small bottle of apple cider is made by pressing 5 apples. How many bottles can be made with 30 apples?
- (b) 45 candies are shared equally among 9 students. How many candies does each student get?
- (c) Max uses $\frac{4}{5}$ cup of sauce to cover $\frac{2}{3}$ of a pizza. How much sauce will she need to cover all of the pizza?

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- (d) Henry has $\frac{5}{6}$ pound of sand and puts them in bags that each hold $\frac{3}{4}$ pound. How many bags (or parts of bags) can he fill?
- (e) Dianne has $\frac{3}{2}$ liters of grape juice, and puts them in bottles that hold $\frac{4}{3}$ liters. How many bottles (or parts of bottles) can she fill?
- (f) One cup of Tasty-O's gives $\frac{4}{5}$ of your daily value of sugar. How much of your daily value of sugar would you get from $\frac{2}{3}$ of a cup?
- (g) Luke is painting a wall, using $\frac{8}{3}$ ounces of paint for $\frac{4}{5}$ square feet on the wall. How much paint does he use for each square foot?
- (h) A silly mug holds $\frac{2}{3}$ cup of coffee. How much coffee (in cups) is in the mug when it is $\frac{5}{8}$ full?
- (i) Denise uses $\frac{5}{8}$ cup of sauce to cover $\frac{2}{3}$ of a pizza. How much sauce will she need to cover all of the pizza?
- (j) Roger has $\frac{5}{8}$ pound of rice and puts them in jars that each hold $\frac{2}{3}$ pound. How many jars (or parts of jars) can he fill?
- (k) A bucket can hold up to $\frac{7}{2}$ cups of water. If Anne puts in just $\frac{4}{3}$ cup, what portion of the bucket is full?

6. Use one of the two interpretations of the *meaning of division* to explain how to solve the fraction division problem $3 \div \frac{5}{8}$. Do not use the standard “invert and multiply” procedure. Instead, draw a picture and/or a double number line to explain how to find the answer. You may use either of the two interpretations, but you must state clearly which one you are using.

7. Demonstrate the scaffold method of long division for the problem

$$1428 \div 6$$

and interpret the steps in this algorithm in terms of the following story problem: 1428 plastic monkeys are to be divided equally among 6 barrels. How many monkeys should be put in each barrel?

8. Complete the indicated arithmetic (multiplication or division), showing your work in a way that is clear and easy to follow. You do not need to explain in words.

- (a) $\frac{3}{4} \times 1\frac{1}{2}$
- (b) $1 \div \frac{2}{3}$
- (c) $\frac{4}{5} \div 2\frac{2}{5}$
- (d) $2\frac{1}{2} \times \frac{3}{2}$
- (e) $\frac{4}{7} \div \frac{3}{8}$

9. For each of the following story problems, write a division problem that can help answer the question. Decide whether the question is best answered by a whole number with remainder, with a mixed number, or with another number. Explain which and then give the answer in that form.

- (a) 34 labradors need to be split evenly among 5 large kennels. How many labradors should be put in each kennel?
- (b) 34 pounds of gravel need to be split evenly among 5 bags. How many pounds should be put in each bag?
- (c) Tom and Anne are packing their rock collection. They have 30 rocks all together, and they want to pack them with 9 rocks in each box. If they put more than 9 rocks in a box, it will be too heavy for them. How many boxes will they need to pack up all the rocks?
- (d) For snack time, 13 liters of juice are divided equally into 4 pitchers, one for each table. How much juice should go in each pitcher?
- (e) Jack and Jill are fetching water. They can carry 6 cups of water in their pail (without spilling any), and they need 23 cups of water for the evening. How many trips will it take to fetch enough water? (Assume they just have the one pail, and no other water-carrying containers.)
- (f) Jack and Jill have 23 cups of water at home, and they are using it to make 6 different colors of cloth dye (for tie-dye). If they use the same amount of water for each color, how much will that be?

10. Applications of division.

- (a) Explain how to use division to convert the improper fraction $\frac{215}{6}$ to a mixed number.
- (b) Use long division to convert $\frac{22}{7}$ to a decimal, showing 5 digits after the decimal point. You do not need to explain your work, although it should be clear and easy to follow.