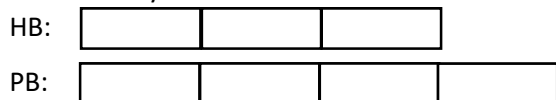Ratio and percent review practice problems:

1. Understand and convert between different ways of expressing a ratio relationship. For example:
This bar diagram shows the relationship between the number of hard back books and the number of paper back books on my shelf:

HB:

PB:

a. Give two examples of how many hard back and how many paperback books I could have

        HB 3 and PB 4 or HB 6 and PB 8 or HB 30 and PB 40

b. Write two sentences describing the amount of hard back and paperback books I have as a ratio.

        The ratio of hardback to paperback books is 3:4.

        The ratios of paperback books to hardback books is 4:3

c. Write two sentences telling what fraction of the books are each kind.

        Three sevenths of the books are hardback.

        Four sevenths of the books are paperback.

d. Write two sentences telling how many times as many books are of one kind as the other.

        There are 3/4 as many hardback as paperback books.

        There are 1 1/3 times as many paperback as hardback books.

e. Writ two sentences telling what percent of the books are of each kind.

        43% of the books are hardback.
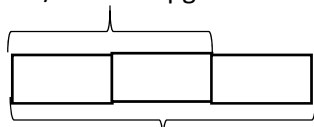
        47% of the books are paperback

2. Find unit rates and use them to solve problems. Examples:

    a. Mark can read 50 pages in 2/3 of an hour. How many pages can he read in one hour?

$$\frac{50 \; pages}{2/3 \, hr} = \frac{50 \times 3 \; pgs}{2 \, hr} = 75 \text{ pages per hour}$$

      2/3 hr = 50 pgs $50 \div 2 = 25$

      1 hr = ? minutes $25 \times 3 = 75$ pages in 1 hour.

b. A 28 oz. can of tomato sauce costs $2.10, and a 16 oz can of tomato sauce costs $1.60. Which has the lowest cost per ounce?

   Large can: $\dfrac{\$2.10}{28 \; oz} = \dfrac{\$.30}{4 \; oz} = \dfrac{\$.075}{1 \; oz}$ Small can: $\dfrac{\$1.60}{16 \; oz} = \dfrac{\$.10}{1 \; oz}$. The large can costs less per ounce.

c. Almonds cost \$2.40 for 8 ounces. If the cost is proportional, how much does it cost to get 36 ounces of almonds.

$$\frac{\$2.40}{8 \text{ oz}} = \frac{\$.30}{1 \text{ oz}} \text{ so } \frac{\$.30}{1 \text{ oz}} \cdot 36 \text{ oz} = \$10.80$$

3. Solve some ratio problems. I may specify that you show how to solve a problem using bar diagrams. Examples:

a. Janet has 3/5 as many Pokemon cards as Alex. Alex has 30 more Pokemon cards than Janet. If Alex gives 10 cards to Janet, what will the new ratio be of Janet's cards to Alex's cards?

Janet [ ][ ][ ]   30
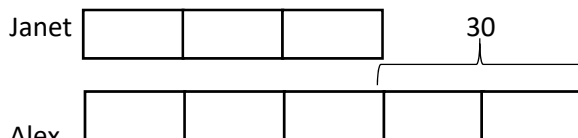
Alex [ ][ ][ ][ ][ ]

[ ] =30 ÷ 2 = 15

Janet had 15 × 3=45 cards. Alex had 15 × 5 = 75 cards. Later

Janet will have 55 cards, Alex will have 65 cards.

The new ratio of Janet's cards to Alex's cards will be 55:65 = 11:13

b. There are 2/3 as many real eggs as chocolate eggs hidden in the garden. If there are 30 eggs total (chocolate and real) hidden in the garden, how many chocolate eggs are in the garden?

real [ ][ ]

chocolate [ ][ ][ ]   30 eggs total
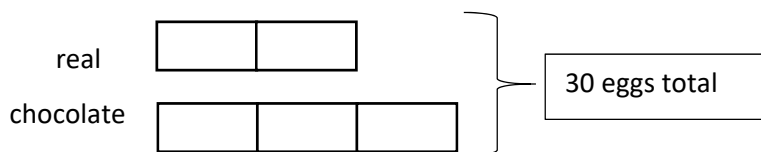
[ ] =30 ÷ 5 = 6

3 × 6 = 18 chocolate eggs

c. In a bag of M&Ms there are 3/5 as many red M&Ms as green M&Ms. There are 15 red M&Ms. How many green M&Ms are there?

15

red [ ][ ][ ]
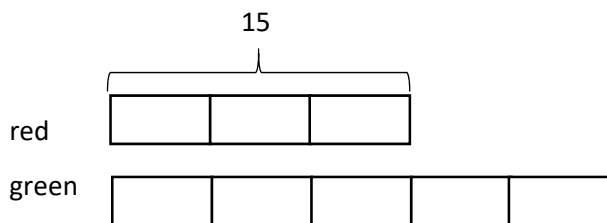
green [ ][ ][ ][ ][ ]

[ ] = 15 ÷ 3 = 5

5 × 5=25   There are 25 green M&Ms

4. Show how to solve 3c both using a bar diagram (**Above**) and by multiplying or dividing. Explain how you decided what to multiply or divide.

$\dfrac{3}{5}$ known amount: 15
   unknown amount?   so I can do $15 \div \dfrac{3}{5} = 15 \times \dfrac{5}{3} = \dfrac{75}{3} = 25$
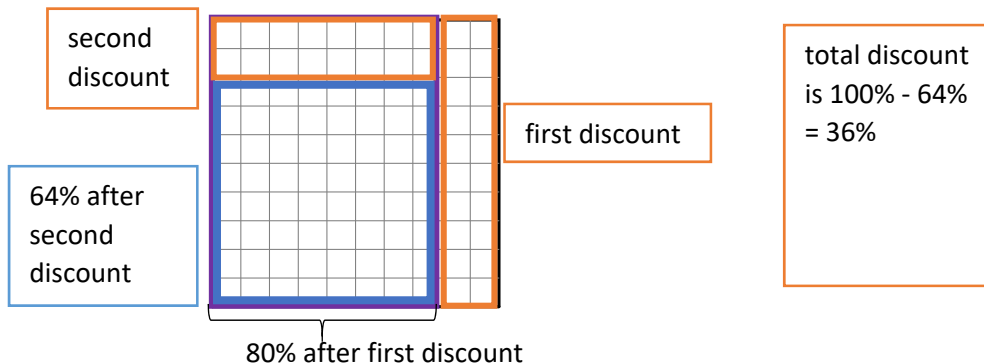
5. Solve problems with percents using 100-grids. Examples:

a. Jan's credit card balance at the end of last month was $1025. After paying for car repairs, Jan's credit card balance is now $1345. By what percent did her credit card balance increase?

$$\$1025 \text{ so } \square = \$1025 \div 100 = \$10.25$$
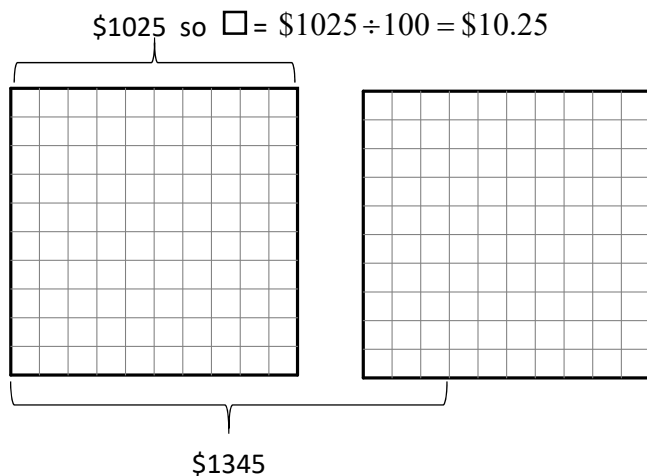
$1345

How many squares make $1345? Calculate $1345 \div 10.25 \approx 131\%$
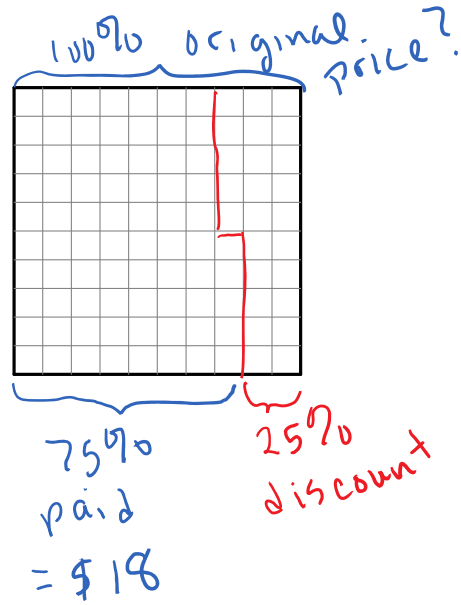
Her balance increased by 31%

b. Winter jackets at the clothing shop were discounted by 20% in March, and then discounted by another 20% in April. What was the total discount?

second discount

first discount

64% after second discount

80% after first discount

total discount is 100% - 64% = 36%

Or do an example with dollars:

original price $100

second price = $80

$\square = \$100/100$
$= \$1$

$\square = \$80/100 = \$.80$

total discount is
$20 + $16 = $36
$36 is 36% of $100, so the total discount is 36%

price after first discount is 80 × $1 = $80

first discount is 20 × $1 = $20

second discount is 20 × $.8 = $16

c. Maya bought a game that was on sale 25% off. She paid $18 for the game. How much did the game cost before the discount?

100% original price?

$$\square = \frac{\$18}{75} = \$.24$$

Original price 100 × $.24

$$= \$24$$

75% paid = $18

25% discount