NAME:_____   Math 7.1, Periods_____

Tran/Rogove   Date:_____

Percents and Proportional Relationships
Study Guide

Instructions: *This study guide has a new format. Please note that questions follow each section and are not contained to the end of the study guide.* ***I would like for you to show your work on a separate piece of paper, staple it to this study guide, and place your final answers in the space provided below***. *Please let me know if you have any questions. This study guide is due January 25.*

PERCENTS, FRACTIONS AND DECIMALS

Percent: this means "out of 100". A percent is the numerator of a fraction that has a denominator of 100.
Examples:

$$\frac{12}{100} = 12\% \qquad\qquad \frac{0.44}{100} = 0.44\% \qquad\qquad \frac{127}{100} = 127\%$$

To calculate from a fraction to a percent: Find an equivalent fraction with a denominator of 100. Hint: You might need to cross-multiply in order to do this.
Examples:

$$\frac{6}{15} = \frac{40}{100} = 40\% \qquad\qquad\qquad \frac{5}{8} = \frac{62.5}{100} = 62.5\%$$

To calculate from a decimal to a percent: Multiply the decimal by 100 and add the percent symbol (%).
Examples:

$$0.043 = 4.3\% \qquad\qquad 0.00043 = 0.043\% \qquad\qquad 43 = 4300\%$$

Problem Set: Convert all fractions and decimals to percents below.

1.	$\frac{6}{15} =$	5.	$8.919 =$
2.	$\frac{13}{8} =$	6.	$0.45 =$
3.	$\frac{3}{1000} =$	7.	$0.0562 =$
4.	$\frac{0.56}{100} =$	8.	$0.0009902 =$

For more examples, refer back to lesson 1

FINDING PERCENTS

The following formulas are equivalent to each other, and you can use them to solve most problems involving percents.

$$Part = Percent \times Whole$$

$$Percent = \frac{Part}{Whole}$$

Examples:

What is 15% of 120?
15 is the percent, 120 is the whole, and we need to find the part.
$$Part = .15 \times 120 = 18$$

There are 300 M&Ms, and 72 of them are blue. What percent is that?
72 is the part, 300 is the whole, and we need to find the percent.
$$Percent = \frac{72}{300} = .24 = 24\%$$

> *The most important thing to do when solving these problems is to read carefully! Think about your answer— does it make sense??*

Problem Set:

9. What is 125% of 480?	Answer:
10. 34 is 60% of what number?	Answer:
11. What percent of 70 is 28?	Answer:
12. What percent of 28 is 70?	Answer:
13. There are a total of 18 pillows throughout Max's home. He uses 4 of them when he sleeps. What percentage of the pillows does Max use every night?	Answer:
14. Alison got $1,500 for her birthday, and invested 42% in the stock market. How much money did she invest in stocks?	Answer:
15. Molly had 12 stickers on the envelope containing her reading packet and Raedyn has 18. How many stickers does Molly have as a percentage of the number of stickers that Raedyn has?	Answer:
16. How many stickers does Raedyn have as a percentage of the number of stickers that Molly has?	Answer:

For more examples, refer back to lessons 2, 3, 5, and 6

PERCENT INCREASE AND DECREASE

Percent increase/decrease is the percent represented by an increase/decrease of the quantity to the whole.

The rule we need to follow is a variation on one we're familiar with:

$$Instead\ of: \quad Percent = \frac{Part}{Whole} \quad Use: \quad \boldsymbol{Percent\ Change = \frac{amount\ of\ change}{original\ amount}}$$

Examples:

Ian had 6 chairs and then got 4 more at Target before his party. He increased the number of chairs he had by 66%.

Madeleine had 10 missing homework assignments and then turned in 8 of them. The number of assignments she was missing decreased by 80%.

For more complicated percent problems, it will help to write out a sentence about what you know, and if possible, **draw a diagram.**
Example: _Colin was trying to reduce the number of hours he spent gaming each week. This week he spent 24 hours playing games. This was 25% decrease from last week. How many hours of games did Colin play last week?_
24 hours is 75% of the number of hours that Colin that gamed last week…the original amount (or whole) is our unknown quantity…so our equation becomes
$$24 = 75\%\ (whole)$$
$$24 = .75x$$
$$32 = x$$

Problem Set:

17. Jackson had 48 crayons at the beginning of the school. He lost several of them, and broke others. By February break, he only had 30 left. What was the percent decrease?	Answer:
18. Jeff's doctor told him he needed to consume 40% more calories each day in order to maintain a healthy weight. He achieved that goal by consuming 2100 calories a day. How many calories had he previously been eating?	Answer:
19. Mari needed to delete photos from her phone in order to have enough memory to download a favorite show of hers. She had 156 photos and she erased 91 of them. By what percent did she decrease the number of photos on her phone?	Answer:

For more information, refer back to lessons 4 and 6

MARKUPS AND MARKDOWNS

When we talk about prices, we talk about markup (increasing a price) and markdown (decreasing a price).

A **markup** or **markdown** is an amount, but a **markup rate** or **markdown rate** is a percent.
Example: A pair of sneakers originally priced at $50 that sells for $35 has a $15 markdown and a 30% markdown rate.

You can use the following rule when solving markup and markdown problems
$$Selling\ Price = (1 + m)(Original\ Price)\ (for\ markups)$$

$$Selling\ Price = (1 - m)(Original\ Price)(for\ markdowns)$$

(m is the markup or markdown rate)

Problem Set:

20. Lizzy is selling soaps at the farmer's market for 30% less than she sells in her store. She has a sign at the farmer's market that says: Lizzy's Lucious Soap: Only $3.50 per bar. How much does the soap sell for in her store?	Answer:
21. Sports teams have dynamic pricing where they often times charge more for games that they expect to be in high demand. At AT&T Park, seats in the upper deck for regular games cost $65, but the premium games (like the Dodgers or fireworks nights) cost 30% more. What is the price of an upper deck seat at a Dodgers-Giants game?	Answer:
22. Macy's is having a season ending clearance. They are advertising 25% off their already low prices. While shopping there, we saw a new set of pots of pans that were originally $420. When we got to the register, the sales clerk told us that we could get an additional 15% off if we opened up a Macy's credit card. We did it. How much were the pots and pans?	Answer:
23. At Kohl's, the more you spend, the more you save. If you buy more than $50, you can get 10% off your total purchase, and if you spend more than $100, you can get 20% off your entire purchase. On a recent shopping spree, I was keeping track of the items in my cart, and saw that what I was planning on buying had an original price of $92. Would it make sense for me to purchase something for $8?	Answer:

For more examples, refer back to Lesson 7

TAX, COMMISSION, TIP, AND FEES

Tax: taxes are typically paid to a government entity (local, state, and national) in exchange for public services. Home owners pay property tax. Many consumers pay sales tax. Companies also pay taxes. These taxes pay for things like roads, schools, and public safety (fire, police, EMT).
Example: Businesses in Mountain View charge 8.75% in sales tax. If you bought shoes for $40, you would pay $3.50 in tax.

Commission: Salespeople earn commission when they sell items (especially high priced items). Real Estate agents typically earn commission on selling homes. Car salespeople earn commission based on selling a car.
Example: A real estate agent who sold a $400,000 house earned a 3% commission and made $12,000 for the sale.

Tip: A gratuity that is added to the cost of bill for people who provide certain services. We typically tip at a restaurant, at a barbershop, and in a taxi or limo.
Example: Max and Daniela went to lunch together and the bill came to $25.00 . they decided to leave a 20% tip, which works out to $5.00.

Problem Set:

24. Maia was shopping online for new reading material, and found a box set of "One Piece", one of favorite series. It was originally priced at $185, but on sale for 35% off. After 8.5% sales tax, how much was Maia's set of books?	Answer:
25. Melissa earns 7.5% commission for all of her sales at Pacific sales. In January, she sold 3 dishwashers and 5 washer/dryer combos. Her total sales were $8,490. What was her commission for the month?	
26. The Olive Garden serves tasty food at a reasonable price. Recently, Daisy took her family for dinner and the total bill came to $56.72. She decided that the service was good, but not great, so she left an 18% tip. How much did she leave all together? (round to the nearest penny)	

For more examples, refer back to Lesson 10