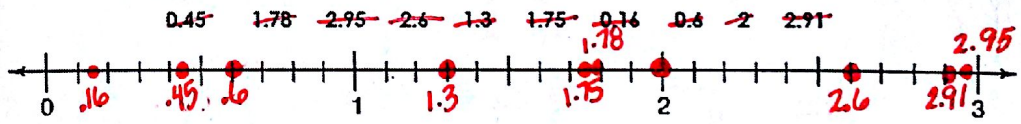
Foundations of Algebra
Unit 1 Review Guide

Number Sense & Quantity

Name: Key

What I Need to Know	Things to Remember	Practice	
1. Operations with Integers		a. Add or Subtract: -5 + 3 = -2 3 + 9 = -6 4 + (+8) = 12 -5 + -4 = -9	b. Multiply or Divide: 4 x -5 = -20 18 ÷ -6 = -3 -7 x -3 = 21 -8 ÷ -2 = 4
		c. How do you know when the sum of a positive and negative integer will be positive? When the absolute value of the positive number is bigger than the absolute value of the negative #.	d. c. How do you know when the sum of a positive and negative integer will be negative? When the absolute value of the negative # is greater than the absolute value of the positive #.
2. Real World Applications of Integers		a. Represent the scenario with an integer: -You take the elevator to 14th floor. 14 -The temperature is seven degrees below zero. -7	b. Amara jumped off the diving board that was 12 feet in the air and went 9 feet below the water's surface. How far did she travel? 12 to -9 21 feet
3. Powers of 10		a. Multiply or Divide: 5.7 x 100 = 570 0.42 x 10 = 4.2 5670 ÷ 1000 = 5.67	b. Multiply or Divide: 450 x 0.01 = 4.5 450 ÷ 100 56 ÷ 0.1 = 560 56 x 10
4. Decimal Comparison		a. Order from least to greatest: ~~2.13~~, ~~2.561~~, ~~2.098~~, 2.56, ~~2.375~~, ~~2.36~~ 2.098, 2.13, 2.36, 2.375, 2.56, 2.561	b. Compare the following decimals: 0.56 > 0.50 0.350 = 0.350
5. Decimals on a Number Line		a. Plot the following points on the number line. ~~0.45~~ ~~1.78~~ ~~2.95~~ ~~2.6~~ ~~1.3~~ ~~1.75~~ ~~0.16~~ ~~0.6~~ ~~2~~ ~~2.91~~ 	
5. Rounding Decimals		a. Complete the chart below:	

	Round to the nearest hundred	Round to the nearest ten	Round to the nearest one	Round to the nearest tenth	Round to the nearest hundredth	Round to the nearest thousandth
4735.1628	4700	4740	4735	4735.2	4735.16	4735.163
258.0751	300	260	258	258.1	258.08	258.075
632.9516	600	630	633	633.0	632.95	632.952

6. Decimal Word Problems		a. Jack has 78 dimes, 16 quarters, and 410 pennies. How much money does he have? 410 = $4.10 78 = $7.80 16 = $4.00 $15.90	b. Mia is traveling from Atlanta to Los Angeles, which is 2,175 miles. She wants to drive the same number of miles for 10 days. How many miles will they drive per day? Round your answer to the nearest mile. 2,175 ÷ 10 = 217.5 mi per day 218 mi per day

7. Comparing Decimals & Fractions

a. Name an equivalent fraction for each decimal:

0.6 = 6/10 0.37 = 37/100

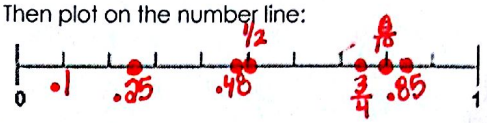
3.3 = $3\frac{3}{10}$ 4.059 = $4\frac{59}{1000}$

b. Order the numbers from least to greatest:

~~0.48~~, $\frac{1}{10}$, ~~0.85~~, ~~$\frac{3}{4}$~~, ~~$\frac{1}{2}$~~, ~~$\frac{8}{10}$~~, and ~~0.25~~

.1 .75 .5 .8

Then plot on the number line:



8. Benchmark Fractions

a. Determine if the following fractions are close to 0, equal to ½, little less than ½ (< ½), little more than ½ (> ½) , or close to 1:

$\frac{1}{3}$	$\frac{3}{8}$	$\frac{7}{9}$	$\frac{5}{6}$	$\frac{11}{12}$	$\frac{2}{10}$	$\frac{9}{10}$	$\frac{1}{8}$	$\frac{2}{6}$	$\frac{6}{11}$	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{4}{9}$	$\frac{3}{7}$	$\frac{3}{4}$	$\frac{3}{6}$
$<\frac{1}{2}$ or 0	$<\frac{1}{2}$	1	1	1	0	1	0	$\frac{1}{2}$ or 0	$\frac{1}{2}$	0	$\frac{1}{2}$ or 1	$<\frac{1}{2}$	$<\frac{1}{2}$	$\frac{1}{2}$ or 1	$\frac{1}{2}$

9. Ordering Fractions

a. Order from least to greatest:

$\frac{4}{5}, \frac{4}{10}, \frac{4}{12}, \frac{4}{7}$

4/12, 4/10, 4/7, 4/5

b. Order from least to greatest:

~~$\frac{4}{9}$~~, $\frac{7}{13}, \frac{2}{7}, \frac{10}{11}$

$<\frac{1}{2}$, $>\frac{1}{2}$, 0, 1

$\frac{2}{7}, \frac{4}{9}, \frac{7}{13}, \frac{10}{11}$

10. Converting Between Improper and Mixed Numbers

a. Convert to improper fractions:

$1\frac{3}{8} = \frac{11}{8}$ $7\frac{3}{4} = \frac{31}{4}$

b. Convert to mixed numbers:

$\frac{27}{8} = 3\frac{3}{8}$ $\frac{13}{5} = 2\frac{3}{5}$

10. Operations with Fractions

a. Add or Subtract:

$\frac{3}{5} - \frac{1}{3} = \boxed{\frac{4}{15}}$

$\frac{9}{15} - \frac{5}{15}$

$\frac{3}{5} + \frac{1}{4} = \boxed{\frac{17}{20}}$

$\frac{12}{20} + \frac{5}{20}$

$2\frac{2}{3} - \frac{1}{4} = \boxed{2\frac{5}{12}}$

$2\frac{8}{12} - \frac{3}{12} =$

$12\frac{1}{7} - 8\frac{2}{3} = \boxed{3\frac{10}{21}}$

$11\frac{24}{21} - 8\frac{14}{21} =$

b. Multiply or Divide:

$\frac{7}{10} \times \frac{12}{21} = \boxed{\frac{1}{15}}$ (5, 3)

$\frac{2}{5} \div \frac{1}{6} = \frac{\frac{2}{5} \cdot \frac{6}{1}}{\frac{1}{6} \cdot \frac{6}{1}} = \boxed{\frac{12}{5}}$

$6\frac{4}{5} \div \frac{1}{2} = \frac{\frac{34}{5} \cdot \frac{2}{1}}{\frac{1}{2} \cdot \frac{2}{1}} = \boxed{\frac{68}{5}}$

11. Operations with Fractions (Word Problems)

a. A stack of board is 21 inches high. Each board is $1\frac{3}{4}$ inches thick. How many boards are there?

$21 \div 1\frac{3}{4}$

$21 \div \frac{7}{4} = \frac{21}{1} \cdot \frac{4}{7} = 12$

$\frac{7}{4} \cdot \frac{4}{7}$

12 boards

b. DJ Gabe is going to serve $\frac{1}{3}$ of a whole pizza to each guest at his party. If he expects 24 guests, how many pizzas will he need?

$\frac{1}{3} \times \frac{24}{1} =$ **8 pizzas**

c. $3\frac{1}{3}$ feet are cut off a board that is $12\frac{1}{4}$ feet long. How long is the remaining part of the board?

$12\frac{1}{4} - 3\frac{1}{3}$

$12\frac{3}{12} - 3\frac{4}{12} =$ **$8\frac{11}{12}$ ft**

d. $\frac{3}{8}$ of the corn in the US is grown in Iowa. $\frac{1}{4}$ of it is grown is Nebraska. How much of the corn supply is grown in the two states?

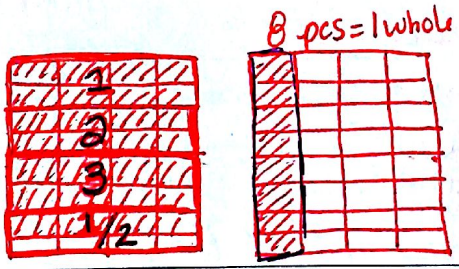
$\frac{3}{8} + \frac{1}{4}$

$\frac{3}{8} + \frac{2}{8} =$ **$\frac{5}{8}$ of the corn supply**

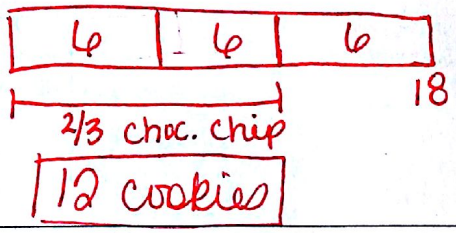
12. Using Visuals to Solve Problems.

a. Use a picture to show how to divide

$\frac{7}{8} \div \frac{1}{4} = 3\frac{1}{2}$



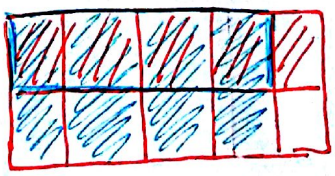
b. Draw a picture to solve the following: Out of 18 cookies, $\frac{2}{3}$ are chocolate chip. How many of the cookies are chocolate chip?



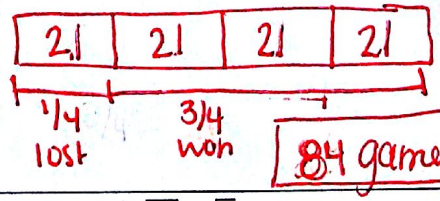
12 cookies

c. Use a picture to show how multiply

$\frac{1}{2} \times \frac{4}{5} = \frac{4}{10} = \frac{2}{5}$



d. The New York Rangers hockey team won $\frac{3}{4}$ of their games last season. If they lost 21 games, how many games did they play in the entire season? 3/4 won 1/4 lost (21)



84 games

13. Simplify Radicals

a. Simplify $\sqrt{20}$

$\sqrt{2 \cdot 2 \cdot 5}$

$2\sqrt{5}$

20 → 5 4 → 2 2

b. Simplify $-4\sqrt{15} \cdot \sqrt{3}$

$-4\sqrt{45}$

$-4\sqrt{3 \cdot 3 \cdot 5}$

$-4 \cdot 3\sqrt{5}$

$-12\sqrt{5}$

45 → 9 5 → 3 3

14. Add or Subtract Radicals

a. $2\sqrt{6} - 2\sqrt{54}$

54 → 9 6 → 3 3 2 3

$2\sqrt{6} - 2\sqrt{2 \cdot 3 \cdot 3 \cdot 3}$

$2\sqrt{6} - 2 \cdot 3\sqrt{6}$

$2\sqrt{6} - 6\sqrt{6}$

$\boxed{-4\sqrt{6}}$

b. $3\sqrt{12} + 3\sqrt{3}$

12 → 4 3 → 2 2

$3\sqrt{2 \cdot 2 \cdot 3} + 3\sqrt{3}$

$3 \cdot 2\sqrt{3} + 3\sqrt{3}$

$6\sqrt{3} + 3\sqrt{3}$

$\boxed{9\sqrt{3}}$

c. $\sqrt{5}(8\sqrt{12} + 1)$

60 → 4 15 → 2 2 3 5

$8\sqrt{60} + \sqrt{5}$

$8\sqrt{2 \cdot 2 \cdot 3 \cdot 5} + \sqrt{5}$

$8 \cdot 2\sqrt{15} + \sqrt{5}$

$\boxed{16\sqrt{15} + \sqrt{5}}$

d. $-3\sqrt{20} - \sqrt{5} + 8\sqrt{3}$

20 → 5 4 → 2 2

$-3\sqrt{2 \cdot 2 \cdot 5} - \sqrt{5} + 8\sqrt{3}$

$-3 \cdot 2\sqrt{5} - \sqrt{5} + 8\sqrt{3}$

$-6\sqrt{5} - \sqrt{5} + 8\sqrt{3}$

$\boxed{-7\sqrt{5} + 8\sqrt{3}}$

15. Rational & Irrational Numbers

a. Explain the outcome of $\sqrt{4} + \sqrt{16}$.

$2 + 4 = 6$

Since $\sqrt{4} = 2$ and $\sqrt{16} = 4$, I am adding 2 rational numbers, which produces a rational number.

b. Explain the outcome of $2\sqrt{2}(5 + \sqrt{2})$.

$10\sqrt{2} + 2\sqrt{4}$

$10\sqrt{2} + 4$

Since I'm adding a rational and irrational #, my outcome will be irrational.

16. Estimating Square Roots

a. $\sqrt{43}$ is between what two whole numbers?

$\sqrt{36} < \sqrt{43} < \sqrt{49}$

$6 < \sqrt{43} < 7$

b. $\sqrt{71}$ is between what two whole numbers?

$\sqrt{64} < \sqrt{71} < \sqrt{81}$

$8 < \sqrt{71} < 9$