

Name _____

Key

Your score _____ Percent _____

**Unit 1 Rational & Irrational
Numbers Study Guide**

Possible points _____ Grade _____

Math 7 and Math 7+

Name _____

Your score _____ Percent _____

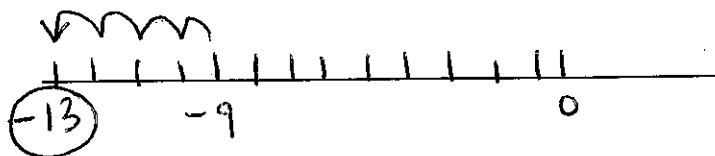
Standard 7.NS.1 and 7.NS.2

Apply and extend previous understandings of addition and subtraction to add, subtract, multiply, and divide rational numbers

1) Use a number line to illustrate the following (use $p = -9$ and $q = 4$):

$$p - q \quad -9 - 4 = -13$$

$$p + (-q) \quad -9 + -4 = -13$$



2) Is this expression true: $p - q = p + (-q)$? Explain by substituting values in for p and q .

$$\begin{aligned}
 -9 - 4 &\stackrel{?}{=} -9 + -4 \\
 -13 &= -13 \quad \text{yes}
 \end{aligned}$$

3) Which of the following statements below describes $p + (-q) = p - q$?

- a) Subtracting a negative number is the same as adding a positive number
- b) Adding a negative number is the same as subtracting a positive number
- c) Subtracting a positive number is the same as subtracting a negative number
- d) Adding a negative number is the same as adding a positive number

$$a + -b = a - b$$

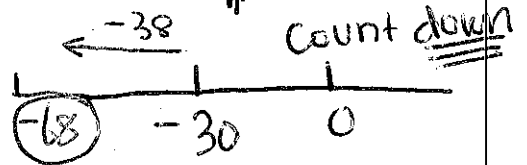
4) Dribble Dee McGee already owes Slapstick Sammy Magoo \$30 and borrows an additional \$38. How much will Dribble Dee McGee have after paying Slapstick Sammy Magoo? Show all work. Express your answer as an integer and in real-life terms (phrase).

Numerically

$$-30 - 38 = -68$$

Verbally:
He owes \$68

Lastly, express the process on a number line:



5) Describe a real-life situation where opposite quantities combine to make 0. When you are finished describing your example, use math to show how both quantities equal 0.

Verbally

I owe \$50.00 on my credit card
 I make a \$50.00 payment
 I owe nothing. $-50 + 50 = 0$

MUST include both

Numerically

Standard 7.EE.4

Use variables to represent quantities in a real world or mathematical problem

Does not say even/odd!

6) The sum of three consecutive numbers is -120. What are the 3 numbers? Make sure to use the "let" statement.

☆
list all 3

$$\begin{aligned} \text{Let the 1st \#} &= X = \boxed{-41} & 3X + 3 &= -120 \\ & & \underline{-3} & \quad \underline{-3} \\ \text{2nd} &= X + 1 = \boxed{-40} & & \\ \text{3rd} &= X + 2 = \boxed{-39} & 3X &= -123 \\ & & \underline{\quad} & \quad \underline{\quad} \end{aligned}$$

$X = -41$

7) The sum of three consecutive EVEN integers is 42. List all 3 numbers. Make sure to use the "let" statement.

☆
List all 3

$$\begin{aligned} \text{Let the 1st \#} &= X = \boxed{12} & 3X + 6 &= 42 \\ & & \underline{-6} & \quad \underline{-6} \\ \text{2nd \#} &= X + 2 = \boxed{14} & & \\ \text{3rd \#} &= X + 4 = \boxed{16} & 3X &= 36 \\ & & \underline{\quad} & \quad \underline{\quad} \end{aligned}$$

$X = 12$

Does say even/odd

Standard 7.NS.3

Solve real-world and mathematical problems involving the four operations with rational numbers

8) Captain Super Awesome Amazing Man is calling his girlfriend, Gabby Complains-a-Lot. He has to call her a lot. He notices his cell phone bill is automatically deducting \$35 from his bank account every month. How much will the deductions total for a 3 year period?

Watch your units!

$$\begin{aligned} -35 * 36 &= -1260 \\ \text{He owes} &\$1260 \end{aligned}$$

$12 * 3 = 36 \text{ months}$

9) A submarine is floating on the surface of Lake Erie. It descends 60 feet, drops 10 more feet, then rises 12 feet, and drops 2 more feet. Express your answer as an integer and in real-life terms.

Numerical

$$\begin{aligned} &-60 - 10 + 12 - 2 \\ &-70 + 12 - 2 \\ &-58 - 2 \\ &-60 \end{aligned}$$

Verbally
submarine is 60 feet below sea level

Standard 7.EE.1

Apply properties of operations as strategies to add, factor, and expand linear expressions with rational coefficients

9) Write an equivalent expression for $-12(-3x + 6) - 10x$. Remember to combine like terms!

$$-12(-3x + 6) - 10x$$

$$36x - 72 - 10x$$

$$26x - 72$$

done

10) Mrs. Melott says the two expressions $3(4a - 3) + 5a$ and $16a - 9$ are equivalent. Is she correct? Explain by using the distributive property and combining like terms in your final answer!

$$3(4a - 3) + 5a \stackrel{?}{=} 16a - 9$$

$$12a - 9 + 5a$$
$$17a - 9$$

$$\neq 16a - 9$$

not equivalent

11) Factor the following expression. Remember to use the *slide technique*, and your answer needs to be in the form of $a(b + c)$ or $a(b - c)$ in order to receive full credit!

$$\begin{array}{r} 2 \overline{) 6a + 10b - 24} \\ 3a + 5b - 12 \end{array}$$

Final:

$$2 \cdot (3a + 5b - 12)$$

Standard 7.NS.2

Apply and extend previous understandings of multiplication and division & of fractions to multiply and divide rational numbers

odd # of negatives

12) Which of the following fractions is equivalent to $\frac{-2}{3}$? Explain your reasoning.

a) $\frac{-2}{-3}$ YES/NO EXPLAIN: even # of negatives

b) $\frac{-8}{12}$ YES/NO EXPLAIN: divide top/bottom by 4 = $-\frac{2}{3}$

c) $\frac{2}{-3}$ YES/NO EXPLAIN: odd # of negatives, test is the same

13) Using long division, express the following fractions as decimals:

$$\frac{1}{6} = 0.\overline{16}$$

$$6 \overline{) 10.16} \\ \underline{6} \\ 40 \\ \underline{36} \\ 4$$

$$\frac{13}{32}$$

$$32 \overline{) 130.40625} \\ \underline{128} \\ 200 \\ \underline{192} \\ 80 \\ \underline{64} \\ 160 \\ \underline{160} \\ 0$$

14) Which fraction will terminate? 2nd one 0.40625

15) Which fraction will repeat? 1st one! 0.16

16) Which of the following statements is true about a fraction whose decimal equivalent will terminate?

- a) Once the fraction is simplified, the numerator can be broken into factors of 3's and/or 5's
- b) Once the fraction is simplified, the denominator can be broken into factors of 2's and/or 5's
- c) Once the fraction is simplified, the denominator can be broken into factors of 3's and/or 5's
- d) Once the fraction is simplified, the numerator can be broken into factors of 2's and/or 3's

~~Denominator~~ Denominator — 2's & 5's or

17) Rational numbers can be categorized in three forms. List the **three forms** of rational numbers & provide examples of each:

- Terminating Example: 0.5
- Repeating Example: 0. $\overline{3}$
- Fractions Example: $\frac{1}{4}$

8. NS. A 1

All rational numbers have a decimal expansion; converting a decimal expansion that repeats into a rational number

18) Simplify. Convert to a proper fraction or a mixed number in simplest form. Show all work!

$-14.\overline{72315}$

↑
don't
forget

$$\frac{72315 - \textcircled{7}}{99990} = \frac{72308}{99990}$$

Final: $-14 \frac{72308}{99990}$

↑
don't forget!!!