DIGITS TOPIC 5 START!!

Note - Multiply and Divide Integers

INB PG. 43

Date - _____

There are many memory aids for figuring out the sign of the answer to a multiply or divide question. If you have forgotten the method taught to you in previous grades, then try this method.

- If there are 2 signs that are the same, the answer will be positive.
- If there are 2 signs that are different, the answer will be negative.

2 signs same ⇨ positive
2 signs different ⇨ negative

Example 1: Evaluate using the times tables if necessary and using the "same - different" rule from above.

a) $(+3)(+7) =$ 21

b) $7(-2) =$ -14 diff = neg

c) $(-1)(+6) =$ -6 diff = neg

d) $(-3)(-4) =$ 12 Same = pos

e) $-1(+3)(-2) =$ $-3(-2) = 6$

f) $(-2)(-4)(-6) =$ $8(-6) = -48$

Example 2: We end up multiplying, as well, when evaluating exponents.

Eg. $2^5 =$ $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 32$

Remember, if the sign is inside the bracket, it is a part of the "base".

a) $(+3)^2 =$ $3 \cdot 3 = 9$

b) $(-2)^4 =$ $-2 \cdot -2 \cdot -2 \cdot -2$ $4 \cdot 4 = 16$

c) $-2^4 =$ $2 \cdot 2 \cdot 2 \cdot 2$ 16

d) $(-1)^3 =$ $-1 \cdot -1 \cdot -1$ $1 \cdot -1 = -1$

e) $(-1)^{\text{even}} =$ 1 even = pos. ans.

f) $(-1)^{\text{odd}} =$ 1 odd = neg ans.

★ If your problem has an even amount of negatives positive.
→ an odd amount will be a negative ans.

Example 3: Now we will evaluate some "divide" questions and a few questions that will mix divide and multiply together.

a) $(-20) \div (-4) = +5$

b) $\frac{-6}{+3} =$ -2

c) $\frac{(-3)(+4)}{-6} =$ $\frac{-12}{-6} = 2$

d) $\frac{(-8)(-6)}{4(-3)} =$ $\frac{48}{-12} = -4$

INB PG. 44

HW - Multiply and Divide Integers (Academic)

(without a calculator)

Last Name - _____ Date Assigned - _____

1. Find each product. (There must be an equal sign between the question and the answer!)

a) $(-3)(+2) = -6$ b) $(-4)(-9) = 36$ c) $(+4)(-3)$ -12

d) $(-7)(-3)$ 21 e) $(5)(+4)$ 20 f) $(-2)(7)$ -14

2. Multiply.

a) $-2(-7) =$ 14 b) $-3(8) =$ -24 c) $5(-7)$ -35

d) $-5(-7)$ 35 e) $-4(-9)$ 36 f) $-4(9)$ -36

3. Find each quotient.

a) $-18 \div (-6) =$ 3 b) $-24 \div 6 =$ -4 c) $51 \div (-17)$ -3

d) $-42 \div (-14)$ 3 e) $-18 \div (18)$ -1 f) $-24 \div (-6)$ 4

g) $60 \div (-12)$ -5 h) $-30 \div (-15)$ 2

4. Divide.

a) $\frac{-50}{5} =$ -10 b) $\frac{-15}{-5} =$ 3 c) $\frac{30}{-6} =$ -5

d) $\frac{48}{-6}$ -8 e) $\frac{16}{-16}$ -1 f) $\frac{-16}{-8}$ 2

g) $\frac{18}{-9}$ -2 h) $\frac{-81}{27}$ -3 i) $\frac{-18}{-9}$ 2

5. Evaluate. Write out expanded form and answer

a) $(-4)^2 =$
(-4)(-4) = 16

b) $(-2)^4 =$
(-2)(-2)(-2)(-2) = 16
4 x 4

c) $(-3)^4 =$

d) $(-5)^2$
(-5)(-5) = 25

e) -5^2
5 x 5 = - 25

f) -4^3
4 · 4 · 4 = -64

g) $(-4)^3$
(-4)(-4)(-4) = - 64
16(-4)

h) $(-2)^5$
(-2)(-2)(-2)(-2)(-2) = - 32
4 x 4 x -2
16 x - 2

i) $(-3)^2$
-3 · -3 = 9

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6. Evaluate.

a) $-1(-2)(+3) =$

2(3) = 6

b) $(+3)(-2)(+5) =$

-6(5) = -30

c) $(-3)(-2)(-6)$

d) $(+1)(-1)(+5)(-2)$

(-1)(-10) = 10

e) $(-3)(-1)(+2)(-7)$

3(-14) = - 42

f) $-1(-3)(+2)(-1)(+4)$

7. Evaluate: Refer to odd and even rule

a) $(+10)^5 =$

100,000

b) $(-10)^7 =$

exponent odd: neg. ans.

-10,000,000

c) $(+1)^{20}$

1

d) $(-1)^{20}$

exponent even: pos. ans.

1

e) $(-1)^{299}$

exponent odd: neg. ans.

-1

f) $(-1)^{500}$

exponent even: pos. ans.

1

8. Calculate. (2 steps each)

a) $\frac{(-2)(+8)}{(-4)} =$

$\frac{-16}{-4} = 4$

b) $\frac{-40}{(-5)(-2)} =$

$\frac{-40}{10} = -4$

c) $\frac{8(-5)}{(-2)(-2)}$

d) $\frac{(-4)(+9)}{(-2)(+3)}$

$\frac{-36}{-6} = 6$

e) $\frac{-10(-6)}{4(-5)}$

$\frac{60}{-20} = -3$

f) $\frac{(-10)(+6)}{(-3)(-2)}$

Multiply and Divide Rational Numbers

Learning Target: I can multiply and divide rational numbers.

- Cross-Simplifying can be used when multiplying only
- Multiplicative inverse is similar to additive inverse
  - > additive inverse = think adding opposites
  - > multiplicative inverse - think of keep, change, reciprocal

Multiply. Write in simplest form.

1. $\frac{3}{5} \cdot \frac{5}{7}$ → $\frac{3}{7}$

2. $\frac{4}{5} \cdot \frac{3}{8}$ → $\frac{3}{10}$

3. $-\frac{1}{8} \cdot \frac{4}{9}$ → negative

4. $\left(\frac{-12}{13}\right)\left(-\frac{2}{3}\right)$ → negative

ON YOUR OWN!!

5. $2\frac{1}{2} \cdot 1\frac{2}{5}$ → $\frac{5}{2} \cdot \frac{7}{5} = \frac{7}{2} = 3\frac{1}{2}$

6. $-6\frac{3}{4} \cdot 1\frac{7}{9}$ → $\frac{-27}{2} \cdot \frac{16}{9} = -12$

11. **FRUIT** Terrence bought $2\frac{5}{8}$ pounds of grapes that cost $2 per pound. Use dimensional analysis to find the total cost of the grapes.

$2\frac{5}{8} \cdot \frac{2}{1} = \frac{21}{4} = 5\frac{1}{4}$ → $5.25

Write the multiplicative inverse of each number.

1. $\frac{5}{7}$ → $\frac{7}{5}$

2. -12 → $-\frac{1}{12}$

3. $-2\frac{3}{4}$ → $\frac{11}{4}$ → $-\frac{4}{11}$

8. $\frac{4}{5} \div 8$ → $\frac{4}{5} \cdot \frac{1}{8} = \frac{1}{10}$

9. $\frac{9}{10} \div 3$ → ON YOUR OWN

10. $-5\frac{5}{6} \div \left(-4\frac{2}{3}\right)$ → $\frac{-35}{6} \div \frac{-14}{3} \rightarrow \frac{-35}{6} \cdot \frac{-3}{14}$

11. $-3\frac{7}{12} \div 6\frac{5}{6}$

ON YOUR OWN!!

12. **BIRDS** The smallest owl found in the United States is the Elf Owl, which weighs $1\frac{1}{2}$ ounces. One of the largest owls is the Eurasian Eagle Owl, which weighs nearly 10 pounds or 156 ounces. The Eurasian Eagle Owl is how many times as heavy as the Elf Owl?

$\frac{5}{4} = 1\frac{1}{4}$

$156 \div 1\frac{1}{2} \rightarrow \frac{156}{1} \div \frac{3}{2}$

$\frac{156}{1} \times \frac{2}{3} = 104$

Target Practice - Use a separate sheet of paper

Multiply. Write in simplest form.

12. $\frac{1}{12} \cdot \frac{4}{7}$
13. $\frac{3}{16} \cdot \frac{1}{9}$
14. $\frac{5}{8} \cdot \frac{4}{5}$
15. $\frac{9}{10} \cdot \frac{2}{3}$
16. $-\frac{9}{10} \cdot \frac{2}{3}$
17. $\left(-\frac{12}{25}\right)\frac{15}{32}$
18. $\left(-\frac{3}{5}\right)\left(-\frac{1}{3}\right)$
19. $\left(-\frac{4}{7}\right)\left(-\frac{1}{20}\right)$
20. $3\frac{1}{3} \cdot \frac{1}{4}$
21. $4\frac{1}{4} \cdot 3\frac{1}{3}$
22. $-3\frac{3}{8} \cdot \left(-\frac{2}{3}\right)$
23. $-\frac{5}{6} \cdot \left(-1\frac{4}{5}\right)$

28. **BAKING** A recipe calls for $\frac{3}{4}$ cup of sugar per batch of cookies. If Gabe wants to make 6 batches of cookies, how many cups of sugar does he need?

29. **POPULATION** Population density measures how many people live within a certain area. In a certain city, there are about 150,000 people per square mile. How many people live in an area of $2\frac{1}{4}$ square miles?

ALGEBRA Evaluate each expression if $r = \frac{1}{4}$, $s = \frac{2}{5}$, $t = \frac{8}{9}$, and $v = -\frac{2}{3}$.

30. rs
31. rt
32. stv
33. rtv

Write the multiplicative inverse of each number.

13. $-\frac{7}{9}$
14. $-\frac{5}{8}$
15. 15
16. 18
17. $3\frac{2}{5}$
18. $4\frac{1}{8}$

Divide. Write in simplest form.

19. $\frac{2}{5} \div \frac{3}{4}$
20. $\frac{3}{8} \div \frac{2}{3}$
21. $\frac{2}{3} \div \frac{5}{6}$
22. $\frac{2}{5} \div \frac{1}{10}$
23. $-\frac{4}{5} \div \frac{3}{4}$
24. $\frac{3}{10} \div \left(-\frac{2}{3}\right)$
25. $-\frac{5}{9} \div \left(-\frac{2}{3}\right)$
26. $-\frac{7}{12} \div \left(-\frac{5}{6}\right)$
27. $\frac{2}{5} \div 4$
28. $\frac{9}{16} \div 3$
29. $\frac{4}{5} \div 6$
30. $\frac{6}{7} \div 4$
31. $3\frac{3}{4} \div 2\frac{1}{2}$
32. $7\frac{1}{2} \div 2\frac{1}{10}$
33. $-12\frac{1}{4} \div 4\frac{2}{3}$
34. $10\frac{1}{5} \div \left(-\frac{3}{15}\right)$

36. **PAINTING** It took 3 people $2\frac{1}{2}$ hours to paint a large room. How long would it take 5 people to paint a similar room?

39. **BAKING** Emily is baking chocolate cupcakes. Each batch of 20 cupcakes requires $\frac{2}{3}$ cup of cocoa. If Emily has $3\frac{1}{4}$ cups of cocoa, how many full batches of cupcakes will she be able to make and how much cocoa will she have left over?