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 Multiplying Integers

3.6c

1). Whole-class activity

5

0

-5

How could you take this picture of 4 and use it to show 4 • 3 ?

5

0

-5

Please draw a picture of 3 • 5

 Our goal is to multiply with negatives. How do you think we could show that?

2). Small-group discussion

With your group, please decide how to show each problem, and give each answer:

5

0

-5

a). -2 • 5 = \_\_\_\_

5

0

-5

b). 5 • -2 = \_\_\_\_

5

0

-5

c). -3 • -4 = \_\_\_\_

5

0

-5

d). -3 + ‑4 = \_\_\_\_

Whole-class discussion

* Points for reflection:
	+ Do you agree with the way other groups drew their pictures?
	+ In general, how do you show multiplying by a negative?
	+ For example, in pictures, what’s the difference between (6)(4) and (6)( -4) ?

Individual Practice

3). Please show that you understand by doing these on your own:

5

0

-5

10

-10

(8)(-3) = \_\_\_\_

5

0

-5

10

-10

(-8)(-3) = \_\_\_\_

5

0

-5

10

-10

(-8)(3) = \_\_\_\_

4). Try these without a picture:

 a). (-2)(8) = \_\_\_\_ b). (-2)(-8) = \_\_\_\_ c). -2 + -8 = \_\_\_\_ d). (-2) + (8) = \_\_\_\_

Small-group activity

5).

* Please choose two integers so that when you multiply them, the sign (+ or -) of the answer is different than what you would get if you added them. Create a visual diagram explaining why the signs are different.
* Then, using pictures, diagrams, or a rap or other performance, summarize the difference between the rules for adding and multiplying integers. (Performances must be less than 3 minutes).

Individual practice

6). Please practice on your own. Be careful—the questions mix adding, subtracting, and multiplying.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  (-2)(9) = \_\_\_\_ | (-2)(-9) = \_\_\_\_ | (-2) + (-9) = \_\_\_\_ | -2 – -9 = \_\_\_\_ | (2)(-9) = \_\_\_\_ |
| -3 • -5 = \_\_\_\_ | -3 + 5 = \_\_\_\_ | 3 + -5 = \_\_\_\_ | -3 • 5 = \_\_\_\_ | 3 • -5 = \_\_\_\_ |
| ‑3 - -5 = \_\_\_\_ | -3 – 5 = \_\_\_\_ | (10)(-7) = \_\_\_\_ | 10 + (-7) = \_\_\_\_ | ‑10 + -7 = \_\_\_\_ |
| (-10)(-7) = \_\_\_\_ | 3\*-6 = \_\_\_\_ | -3\*(-6) = \_\_\_\_ | -3 + -6 = \_\_\_\_ | -3 + 6 = \_\_\_\_ |

7). Please use the order of operations to evaluate each expression. Check your work with the scrambled answers.

a). **-**3(4 + 5) – 1

**Example:**

 **-**3( 9 ) + **-**1

**-**27 + **-**1

**-**28

b). **-**11 + (**-**4)(**-**6)

c). (**-**1 + **-**3)(4 + **-**2)

**Example:**

 ( **-**4 ) ( 2 )

**-**8

d). **-**4 + **-**2(**-**6+2)

e). 3 – 7 + 2(**-**2)

3 + **-**7 + **-**4

 **-**3(4 + 5) + **-**1

3 + **-**7 + 2(**-**2)

**-**4 + **‑**4

**-**8

f). 4 – 3(5 + **-**9)

g). (2•**-**6 – 1) – 3(**-**2)

**Example:**

**Example:**

(2•**-**6 + **-**1) + **-**3(**-**2)

(**-**12 + **-**1) + 6

**-**13 + 6

**-**7

h). (2 – 8) – 5(5 + **-**8)

Scrambled Answers:

i). 2(-7) + **-**5(-3 – 1)

6

13

9

4

16

3.6c Extension

WHY Flip When Multiplying?

We can actually prove that a positive times a negative equals a negative. To understand, you have to know the Distributive Property. Please fill in the blanks below in the Distributive Property problems:

3(4 + 1) = 3(4) + 3(1)

5(2 + 6) = 5(2) + \_\_(6)

-8(5 + 4) = -8(5) + -8(4)

-3(4 + -2) = \_\_(4) + \_\_( )

Example:

Example:

You try:

You try:

1).

We’ve decided it makes sense to flip our pictures when multiplying by a negative, like this:

5

0

-5

3 • -2 = \_\_\_\_

Flip!

But can we prove that we’re supposed to flip?

The Hard Proof for Flipping when Multiplying

-3 + 3 = 0

We know this:

2(-3 + 3) = 2(0)

We can multiply both sides by 2:

2(-3) + 2(3) = 2(0)

Use the Distributive Property:

Multiply the parts we know:

2(-3) + 6 = 0

How does this prove that 2(-3) has to be negative? Please explain:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Challenge: Can you adapt this proof to prove that a negative times a negative equals a positive? Try it here: