



Signed Multiplication Facts

You can use patterns to analyze the signs of multiplication facts involving positive and negative numbers.

➤ Analyze the sequence of products with 4.

- 1 What pattern do you notice in the products as the numbers multiplied by 4 decrease?

The product decreases by 4 each time.

$$4 \cdot 4 = 16$$

$$4 \cdot 3 = 12$$

$$4 \cdot 2 = 8$$

$$4 \cdot 1 = 4$$

$$4 \cdot 0 = 0$$

- 2 Continue the pattern to determine each product.

(a) $4 \cdot (-1) = -4$

(b) $4 \cdot (-2) = -8$

(c) $4 \cdot (-3) = -12$

- 3 Describe the pattern(s) that you notice in the new products.

They are 4 less than the previous product.

➤ Analyze the sequence of products with -5.

- 4 Describe the pattern and then extend it by writing the next three number sentences.

Each product is 5 more than the previous product.

$$-5 \cdot 5 = -25$$

$$-5 \cdot 4 = -20$$

$$-5 \cdot 3 = -15$$

$$-5 \cdot 2 = -10$$

$$-5 \cdot 1 = -5$$

$$-5 \cdot 0 = 0$$

$$-5 \cdot -1 = 5$$

$$-5 \cdot -2 = 10$$

$$-5 \cdot -3 = 15$$

- 5 How do these products change as the numbers multiplied by -5 decrease?

The product increases by 5

HABITS OF MIND

- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.



ACTIVITY 2 Continued

Look back at the products you have determined in this lesson to answer each question.

6 Describe the sign of the product of each pair of integers.

(a) Two positive integers

positive

(b) Two negative integers

positive

(c) One positive and one negative integer

negative

(d) One integer is zero

zero

7 When you know that the product of two integers is negative, what can you say about the two integers? Give examples.

The two integers have different signs.

$$-3 \cdot 2 = -6$$

$$3 \cdot -2 = -6$$

8 Describe a rule that will help you multiply any two integers.

+	-	-
-	+	-
-	-	+

Even # of negatives = positive

Odd # of negatives = negative

ASK YOURSELF...

Does the order in which you multiply the integers matter?

9 Use your rule to evaluate each expression.

(a) $6 \cdot 5 = 30$

(b) $-8 \cdot 7 = -56$

(c) $-3 \cdot 2 \cdot (-4) = 24$

$6 \cdot (-5) = -30$

$-8 \cdot (-7) = 56$

$-3 \cdot (-2) \cdot (-4) = -24$

$-6 \cdot 5 = -30$

$8 \cdot (-7) = -56$

$3 \cdot (-2) \cdot 4 = -24$

$-6 \cdot (-5) = 30$

$8 \cdot 7 = 56$

$-3 \cdot (-2) \cdot 4 = 24$

$3 \cdot 2 \cdot (-4) = -24$

$-3 \cdot 2 \cdot 4 = -24$



ACTIVITY 3 Continued

Same rules apply that were used for multiplication

Use fact families to help you determine each answer.

3 Fill in the unknown numbers to make each number sentence true.

(a) $56 \div (-8) = \underline{-7}$

(b) $28 \div (-4) = \underline{-7}$

(c) $-63 \div \underline{9} = -7$

(d) $24 \div \underline{-3} = -8$

(e) $\underline{32} \div (-8) = -4$

(f) $-105 \div \underline{21} = -5$

(g) $\underline{0} \div (-8) = 0$

(h) $-26 \div \underline{26} = -1$

4 Describe the sign of the quotient of each pair of integers.

(a) Two positive integers

positive

(b) One positive and one negative integer

negative

(c) Two negative integers

positive

(d) The dividend is zero

zero

5 How do the answers to Question 4 compare to the answers to the same questions about the multiplication of two integers? **Explain your reasoning.**

REMEMBER...

A quotient is the answer to a division problem.