

PART I GET STARTED

Today's Mathematics

We will use repeated addition and numerical patterns to explain the sign rules for multiplying integers.

Essential Question

How can a pattern justify the sign of an integer product?

DO NOW

Subtract by rewriting each expression as addition of the opposite.

1. $6 - 14$

2. $-9 - 5$

3. $12 - (-7)$

4. $-4 - (-10)$

SEE IT

A pool loses 16 gallons of water each week.

1. Represent one week's change with an integer.
2. Write repeated addition for 4 weeks.
3. Rewrite the repeated addition as multiplication and evaluate.

QUICK WRITE | 2 MINUTES

Predict the sign of a product with one negative factor and explain your reasoning.

PART II INVESTIGATE**BUILD THE SIGN PATTERN**

Complete the table. Continue the product pattern as the first factor decreases by 1.

Expression	Repeated addition / pattern	Product
$3(-4)$	$(-4) + (-4) + (-4)$	
$2(-4)$		
$1(-4)$		
$0(-4)$		
$(-1)(-4)$	Continue the pattern	
$(-2)(-4)$	Continue the pattern	

THINK LIKE A MATHEMATICIAN

1. By how much does each product change?
2. Why must $(-1)(-4)$ be positive?
3. Predict the sign of a product with three negative factors.

COMPARE

How is the sign pattern for multiplication connected to repeated addition?

PART III MAKE SENSE AND PRACTICE

WHAT WE CAN CONCLUDE

1. Same signs produce a positive product; different signs produce a negative product. 2. Any integer multiplied by zero is zero. 3. With several factors, an even number of negative factors gives a positive product; an odd number gives a negative product.

WORKED MODEL

Evaluate $5(-3)(-4)$. $5(-3)(-4) = (-15)(-4) = 60$

FOCUSED PRACTICE

1. Evaluate $(-8)(6)$, $(-11)(-7)$, and $-(-6)^2$.

2. A pool loses 16 gallons each week. Write and evaluate a multiplication expression for the change after 9 weeks.

MATH WRITE | 5 MINUTES

Use the pattern from Part II to justify why a negative times a negative is positive.

PART IV PUZZLE PRACTICE

Homework

Name _____

Date _____

WHEN DO KANGAROOS CELEBRATE THEIR BIRTHDAYS?

Complete each exercise. Find the answer in the answer columns. Write the exercise letter in the matching box.

A	B	C	D	E	F	G	H	I	J	K	L	M	N
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MULTIPLY.

36 G
12 O
-105 E
25 P
50 C
-60 D
72 S
45 N
-25 T
-42 U
49 P
-36 H
52 W
110 R

A. $5(-12)$

B. $-14(3)$

C. $-10(-11)$

D. $8(-7)$

E. $-9(-5)$

F. $6(-2)(-3)$

G. $-4(5)(-4)$

H. $(-7)(-3)(-5)$

I. $-15(0)(-12)$

J. $(-5)^2$

K. -7^2

L. $-3^2(8)$

M. $(-4)^3$

N. Necklace is 9 inches long; 6 beads per inch. Change in supply?

0 A
-25 M
-49 Y
-64 A
80 L
-50 U
100 B
64 F
-56 I
-110 J
66 S
-54 R
-72 E
54 K