

Arithmetic with Positive and Negative Numbers

The **absolute value** of a number is its distance from zero on the number line. For example, -7 (a negative number) and 7 (a positive number) are the same distance from zero on the number line, and both have an absolute value of 7 . Using absolute values simplifies the process of doing arithmetic with positive and negative numbers.

1. Find the absolute value of the following numbers:

a. -7 _____

b. 14 _____

c. $325,000$ _____

d. -475 _____

e. 230 _____

f. -52 _____

Part 1: Adding Positive and Negative Numbers

PROCEDURE: Determine if you are adding numbers that have the same or different signs. Then follow the appropriate set of directions below.

Adding same signs	Example $-3 + (-5)$	Adding opposite signs	Example $-3 + 5$
Step 1: Add their absolute values.	$3 + 5 = 8$	Step 1: Subtract the smaller absolute value from the larger.	$5 - 3 = 2$
Step 2: Make the sign of the answer the same as the sign of the original numbers.	Because -3 and -5 are both negative, the answer will be negative. Answer: $-3 + (-5) = -8$	Step 2: Choose the sign of the number with the greater absolute value.	Because 5 has a greater absolute value than 3 , and 5 is positive, your answer will also be positive. Answer: $-3 + 5 = 2$

Add It Up!

2. Complete the following equations. When finished, go back and check your signs.

a. $14 + (-17) =$ _____

b. $-9 + (-23) =$ _____

c. $-16 + 21 =$ _____

d. $-12 + 12 =$ _____

e. $15 + (-4) =$ _____

f. $-7 + (-7) =$ _____

Arithmetic with Positive and Negative Numbers, continued

Part 2: Subtracting Positive and Negative Numbers

PROCEDURE: To subtract integers, find the opposite of the number you are subtracting. Then *add* this opposite to the number you are subtracting from. The result is your answer.

SAMPLE PROBLEM: $-3 - (-5) = \underline{\quad? \quad}$

Step 1: Find the opposite of the number you want to subtract.

The opposite of -5 is 5 .

Step 2: Add this opposite to the number you are subtracting from.

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

Take It Away!

3. Complete the following subtraction problems. Remember to check your work.

a. $5 - (-7) = \underline{\hspace{2cm}}$ b. $-11 - 5 = \underline{\hspace{2cm}}$

c. $-1 - 1 = \underline{\hspace{2cm}}$ d. $22 - (-8) = \underline{\hspace{2cm}}$

e. $14 - (-3) = \underline{\hspace{2cm}}$ f. $-9 - 4 = \underline{\hspace{2cm}}$

Part 3: Multiplying and Dividing Positive and Negative Numbers

PROCEDURE: To multiply or divide two integers, multiply or divide their absolute values. Then apply the following rule to determine if the answer is positive or negative:

- The product or quotient of two *same-sign* numbers is *positive*.
- The product or quotient of two *opposite-sign* numbers is *negative*.

SAMPLE PROBLEM A: $-7 \times 11 = \underline{\quad? \quad}$

Step 1: Multiply the absolute values to find the absolute value of the product.

$$7 \times 11 = 77$$

Step 2: Apply the rule of signs: Because you are finding the product of *opposite-sign* numbers, the product will be *negative*.

$$-7 \times 11 = -77$$

SAMPLE PROBLEM B: $-12 \div (-4) = \underline{\quad? \quad}$

Step 1: Divide the absolute values to find the absolute value of the quotient.

$$12 \div 4 = 3$$

Step 2: Apply the rule of signs: Because you are finding the quotient of *same-sign* numbers, the quotient will be *positive*.

$$-12 \div (-4) = 3$$



Arithmetic with Positive and Negative Numbers, continued

Challenge Yourself: Multiply Your Way up the Pyramid!

4. Each brick's number is the product of the two numbers under it. Starting on the bottom row, multiply to complete the empty bricks.

