

Adult Learning Academy
Pre-Algebra Workbook
UNIT 6: INTEGERS



LEARNING OBJECTIVES

1. Integer Basics:

- Write and describe signed numbers
- Order and compare integers, using appropriate symbols to express inequalities

2. Operations with Integers

- Add positive and negative integers
- Subtract positive and negative integers
- Multiply positive and negative integers
- Divide positive and negative integers

3. Absolute Value:

- Define *absolute value*, find the absolute value of any integer, and evaluate expressions involving absolute value
- Order and compare absolute values; use appropriate symbols to express inequalities

4. Exponents, Roots, and Scientific Notation:

- Evaluate integers with roots and exponents
- Apply the basic rules of exponents, including rules for positive and negative base numbers, and raising numbers to the zero and first power
- Write numbers in scientific notation
- Convert numbers in scientific notation to standard notation

5. Order of Operations:

- Use the order of operations rules to perform calculations involving integers, absolute values, and exponents

6. Word Problems:

- Solve basic word problems that involve signed numbers, including applications to the STEM industry

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UNIT 6 VIDEO & EXERCISE LIST



Topic	Website	Videos	Exercises
Negative Number Basics	www.khanacademy.org	Negative Numbers Introduction	Number Line 2
		Ordering Negative Numbers	Ordering Negative Numbers
			Number Line 3
Adding Integers	www.khanacademy.org	Example: Adding Negative Numbers	Adding Negative Numbers
		Ex: Adding integers w/ diff. signs	
Subtracting Integers	www.khanacademy.org www.stlcc.edu	Why subtracting neg is adding positive	Adding and Subtracting Neg Num.
		Subtracting Integers PPT on Blackboard	
		Adding/Sub Negative Numbers	
Multiplying/Dividing Neg #	www.khanacademy.org	Multiplying Pos and Neg Numbers	Mult/Div Negative Numbers
		Why Neg x Neg is positive	Negative Number Word Probs
		Dividing Pos and Neg Numbers	
		Example: Mult #'s w/ diff signs	
		Mult and Div Negative numbers	
Absolute Value	www.khanacademy.org	Absolute Value and Number Lines	Finding Absolute Values
		Absolute Value 1	Comparing Absolute Values
		Absolute Value of Integers	
		Comparing Absolute Values	
Exponents	www.khanacademy.org	Level 1 Exponents	Positive and Zero Exponents
		Understanding Exponents 2	
Scientific Notation	www.khanacademy.org	Scientific Notation	Scientific Notation
		Scientific Notation 1	
Square Roots	www.khanacademy.org	Understanding Square Roots	Square Roots
Unit 6 Review Flashcards	www.stlcc.edu	Powerpoint on Blackboard	
Compass Review	http://www.hostos.cuny.edu/oaa/compass/pre-alg_prac4.htm		Signed Numbers

To ADD Integers:

Positive + Positive =

Negative + Negative =

Positive + Negative:
That **DEPENDS** on which number
has the larger absolute value!**EXAMPLES:**

$4 + 5 =$

$-4 + (-5) =$

$4 + (-5) =$

$-4 + 5 =$

$-5 + 5 =$

To SUBTRACT Integers:

ADD the OPPOSITE!

Remember that subtracting a
negative is the same as
adding a positive!**EXAMPLES:**

$4 - 5 =$

$4 - (-5) =$

$-4 - 5 =$

$-4 - (-5) =$

To MULTIPLY or DIVIDE Integers:

Positive x Positive =

Positive \div Positive =

Negative x Negative =

Negative \div Negative =

Positive x Negative =

Positive \div Negative =

Negative x Positive =

Negative \div Positive =**EXAMPLES:**

$10 \times 5 =$

$10 \div 5 =$

$-10 \times (-5) =$

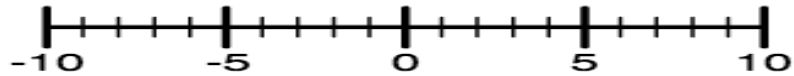
$-10 \div (-5) =$

$10 \times (-5) =$

$10 \div (-5) =$

$-10 \times 5 =$

$-10 \div (5) =$



1. On the number line above,
 - a) Draw a star where -6 would be.
 - b) Draw a heart where -3 would be.
 - c) Draw a smiley face where the OPPOSITE of -8 would be.

2. What is the absolute value of -127?

3. Simplify:

a) $-7 + 0$

b) $-7 + -3$

c) $-7 + 8$

d) $-8 + 7$

e) $|7 + -3|$

f) $0 - 3^2$

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

h) $(1 - 5)^2$

i) $\sqrt{81}$

j) $6 - (-8)$

k) $|-6 \times 7|$

l) -9^2

4. Write in scientific notation:

a) 45,700,000

b) .00039

5. Write in standard notation:

a) 5.4×10^{-6}

b) 5.2×10^4

1. Scientific Notation: For each of the following facts, write the number in scientific notation.
 - a. The largest human chromosome consists of approximately 220,000,000 base pairs.
 - b. Your brain has approximately 100,000,000,000 (one hundred billion) cells.
 - c. A gigabyte is over 1,000,000,000 bytes.
 - d. A rhinovirus is .000000020 meters long.
 - e. The probability of being killed in an airplane crash: .0000002

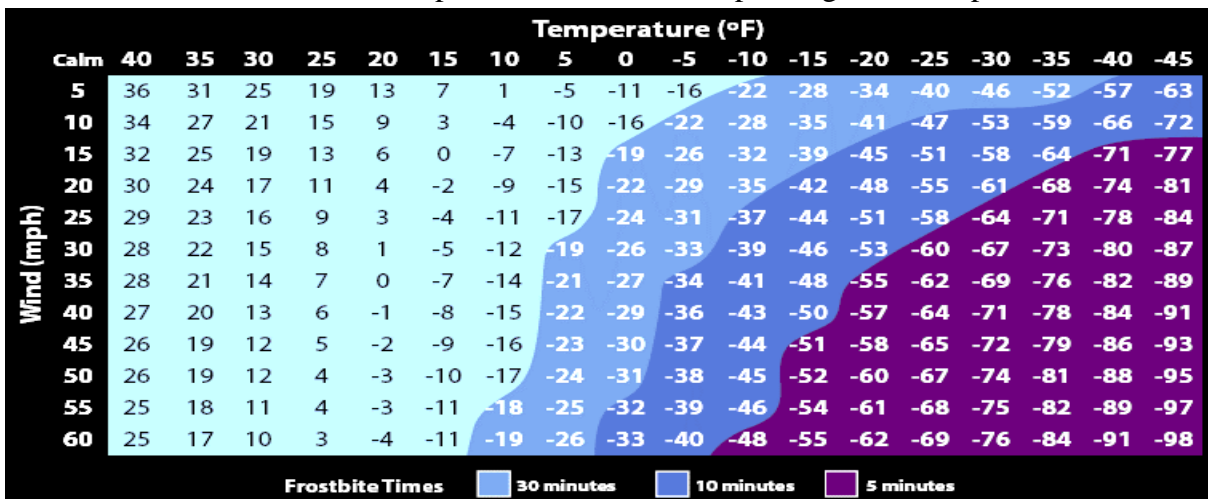
2. For each of the following facts, write the scientific notation as a standard number:
 - a. The human heart beats approximately 2.7×10^9 times in a lifetime.
 - b. Human hair grows at about 1.0×10^{-8} miles per hour.
 - c. There are about 3.0×10^{13} red blood cells in the human body.
 - d. The probability of being struck by lightning: 3.6×10^{-6}
 - e. The probability of winning the lottery: 5.7×10^{-9}
 - f. Looking at *d.* and *e.* above, which is more likely: winning the lottery or being struck by lightning?

3. Mount Everest is 29,029 feet high. The Mariana Trench has a spot that is 36,201 feet deep. What is the difference in elevation between these two places?

4. Air temperature falls 3.5 degrees for every 1000 feet rise in altitude. Fill in the table:

Ground Temperature (F)	Altitude	Temperature at that Altitude
80 degrees	13,000 feet	
20 degrees	12,000 feet	
-10 degrees	15,000 feet	
	13,000 feet	50 degrees
	10,000 feet	-20 degrees
25 degrees		-27.5 degrees

5. A wind chill chart shows how air temperature feels colder depending on wind speed.



- Which feels colder: a 0-degree day with a 5mph wind, or a 10-degree day with a 15mph wind? How much colder does it feel?
- On a 10-degree day, how high a wind speed will create a danger of frostbite within 30 minutes?
- How fast of a wind on a 5-degree day is equivalent to a 10mph wind on a 5-degree day?

RESOURCES

Image used in question 5

[Wind chill](#) is available in the public domain

Image used in questions 6 and 7

[Thermometer F C blank](#) is used with the [permission](#) of [Teacherfiles.com](#); color added in question 6.



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6.1 INTEGER RULES

To ADD Integers

Positive + Positive = **Positive**

Negative + Negative = **Negative**

Positive + Negative = **Depends on which number has the larger absolute value**

Examples

$4 + 5 = 9$

$-4 + (-5) = -9$

$4 + (-5) = -1$

$-4 + 5 = 1$

$-5 + 5 = 9$

To SUBTRACT Integers

ADD the OPPOSITE!

$4 - 5 = -1$

$4 - (-5) = 9$

$-4 - 5 = -9$

$-4 - (-5) = 1$

To MULTIPLY or DIVIDE Integers

Positive x Positive = **Positive**

Positive ÷ Positive = **Positive**

Negative x Negative = **Positive**

Negative ÷ Negative = **Positive**

Positive x Negative = **Negative**

Positive ÷ Negative = **Negative**

Negative x Positive = **Negative**

Negative ÷ Positive = **Negative**

$10 \times 5 = 50$

$10 \div 5 = 2$

$-10 \times (-5) = 50$

$10 \div (-5) = 2$

$10 \times (-5) = -50$

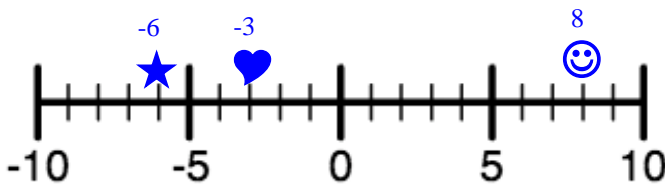
$10 \div (-5) = -2$

$-10 \times 5 = -50$

$-10 \div 5 = -2$

6.2 INTEGER QUIZ

1.



2. **127**

- 3a. **-7** 3b. **-10** 3c. **1** 3d. **-1**
- 3e. **-4** 3f. **-9** 3g. **-11** 3h. **16**
- 3i. **9** 3j. **14** 3k. **42** 3l. **-81**

6.2 INTEGER QUIZ (CONT.)

4a. **4.57×10^7**

4b. **3.9×10^{-4}**

5a. **.0000054**

5b. **52,000**

6.3 Career Applications: STEM

1a. **2.2×10^8**

1b. **1.0×10^{11}**

1c. **1.0×10^9**

1d. **2.0×10^{-8}**

1e. **2.0×10^{-7}**

2a. **2,700,000,000**

2b. **.00000001**

2c. **30,000,000,000,000**

2d. **.0000036**

2e. **.0000000057**

2f. **Being struck by lightning is more likely**

3. **$29,029 - (-36,201) = 29,029 + 36,201 = 65,230$ feet**

4.

Ground Temperature (F)	Altitude	Temperature at that Altitude
80 degrees	13,000 feet	$80 - 3.5(13) = 34.5$ degrees
20 degrees	12,000 feet	$20 - 3.5(12) = -22$ degrees
-10 degrees	15,000 feet	$-10 - 3.5(15) = -62.5$ degrees
95.5 degrees	13,000 feet	50 degrees
15 degrees	10,000 feet	-20 degrees
25 degrees	15,000 feet	-27.5 degrees

5a. **0 °F day with a 5mph wind feels like -11 °F
15 °F day with a 25mph wind feels like -7 °F
0 °F day with a 5mph wind feels 4 degrees colder**

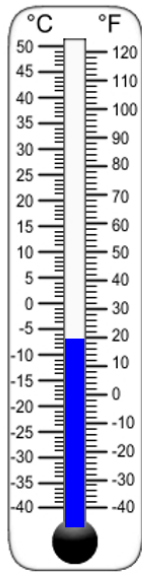
5b. **55 mph**

5b. **40 mph**

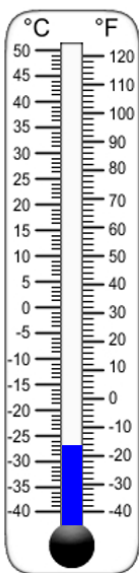
6. **-7° Celsius**

6.3 Career Applications: STEM (cont.)

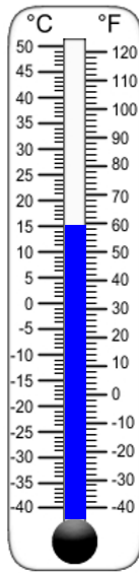
7. a. -7° Celcius



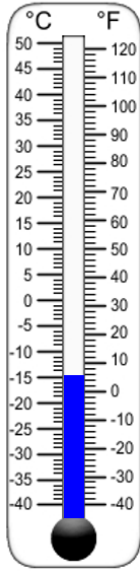
b. -7° Fahrenheit



c. 15° Celsius



d. -15° Celsius



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