Before diving into the math on the ACT tests, quickly review the math the ACT assumes you know. The ACT will not explicitly ask questions on these topics, but since the test writers assume that you know them, many questions will indirectly test them.

Order of Operations

You must know the order of operations for the test. The best way to remember which operation gets performed before another is the acronym PEMDAS, which stands for:

*P*arentheses
*E*xponents
*M*ultiplication
*D*ivision
*A*ddition
*S*ubtraction

If you come across an equation that contains all of these elements, you should first carry out the math within the parentheses, then work out the exponents, then do the multiplication and the division (working from left to right), and finally the addition and subtraction, again working from left to right. For example, take the expression:

$$\frac{(18-3) \times 2^2}{5} - 7 + (6 \times 3 - 1)$$

You would first work out the math in the parentheses (following PEMDAS even within the parentheses, meaning you should do multiplication before subtraction):

$$\frac{15 \times 2^2}{5} - 7 + 17$$

Then work out the exponents:

$$\frac{15 \times 4}{5} - 7 + 17$$

Then do the multiplication:

$$\frac{60}{5} - 7 + 17$$

Then the division:

$$12 - 7 + 17$$

Then the addition and subtraction:

$$22$$

Odd and Even Numbers

You should know about odd and even numbers and the differences between them. For this topic, however, we will provide a very quick review.

Even Numbers

Even numbers are numbers that are divisible by 2 with no remainder. Remember that 0 is included in this definition.

$$\ldots, -6, -4, -2, 0, 2, 4, 6, \ldots$$

Odd Numbers
Odd numbers are numbers that, if divided by 2, will leave a remainder of 1.

$$\ldots, -5, -3, -1, 1, 3, 5, \ldots$$

Operations and Odd and Even Numbers
There are a number of rules regarding operations and odd and even numbers that you should know instinctively.

Addition			Subtraction			Multiplication		
+	**Odd**	**Even**	**−**	**Odd**	**Even**	**x**	**Odd**	**Even**
Odd	Even	Odd	**Odd**	Even	Odd	**Odd**	Odd	Even
Even	Odd	Even	**Even**	Odd	Even	**Even**	Even	Even

Signed Numbers
The term "signed numbers" refers to numbers that include either a positive or negative sign, and are therefore marked as being either greater than zero (positive) or less than zero (negative). Zero has no sign.

Students who are comfortable with positive numbers sometimes get confused when dealing with negative numbers. For example, while positive numbers become larger as they move farther away from zero, negative numbers become smaller: −10 is a smaller number than −1. When dealing with negative numbers, be careful not just to see the 10 in −10 and assume that it is a larger number than −1, unless you are dealing with absolute value, which is covered later in this chapter.

Negative Numbers and Operations
Negative numbers behave differently than positive numbers when you perform various operations on them. In terms of addition and subtraction, negative numbers invert the operations.

ADDING SIGNED NUMBERS
When a negative number is added to another number, the sum will be a smaller number. In fact, adding a negative number is the same as subtracting a positive number of the same absolute value .

$$3 + (-2) = 1, \text{ just as } 3 - 2 = 1$$

SUBTRACTING SIGNED NUMBERS
When a negative number is subtracted from another number, the difference will be a larger number. In fact, subtracting a negative number is the same as adding a positive number of the same value.

$$3 - (-2) = 5, \text{ just as } 3 + 2 = 5$$

MULTIPLYING AND DIVIDING WITH NEGATIVE NUMBERS

Negative numbers also follow sign rules when you multiply or divide them:

× or ÷	Positive	Negative
Positive	Positive	Negative
Negative	Negative	Positive