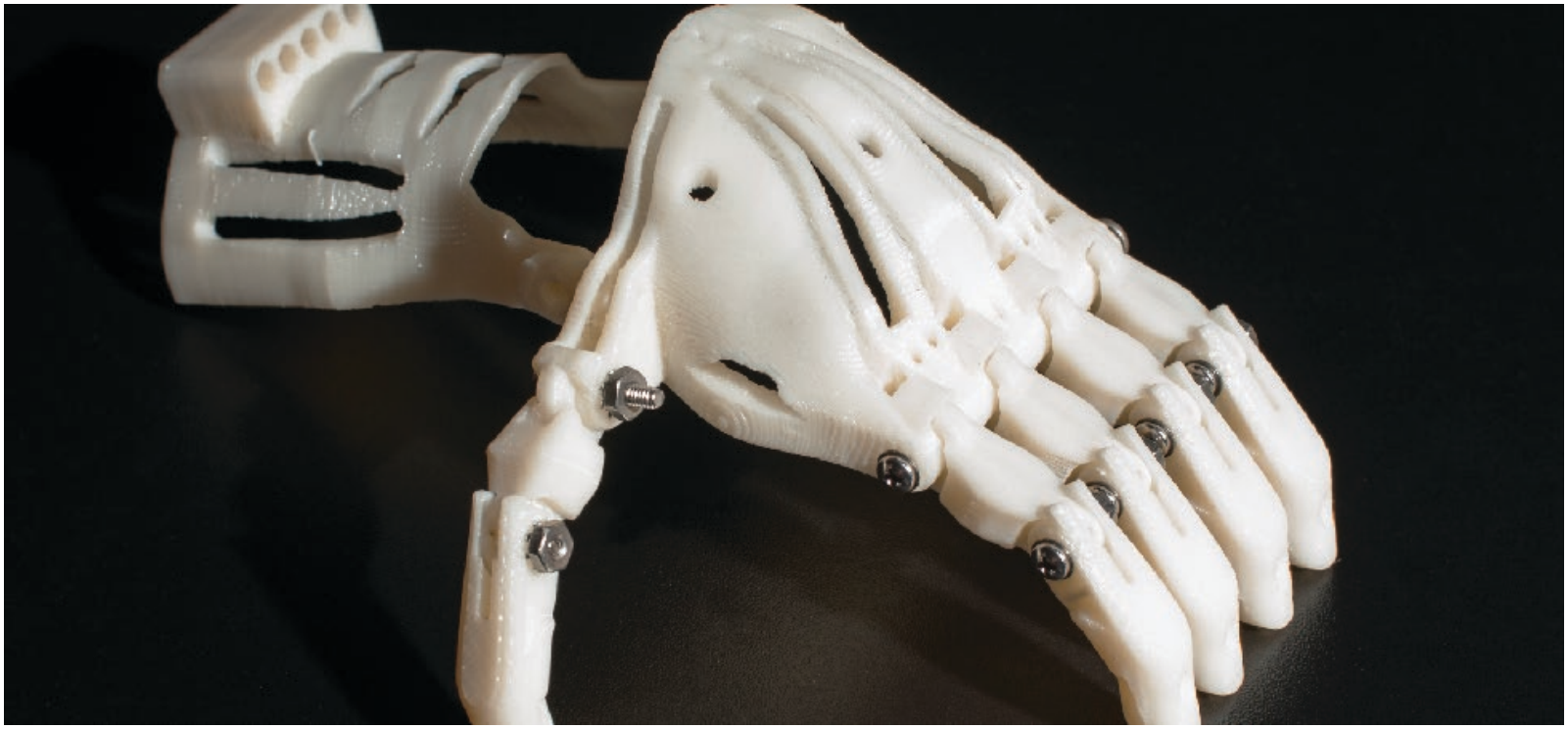
INTERMEDIATE ALGEBRA

Chapter 1 FOUNDATIONS

PowerPoint Image Slideshow

openstax™

FIGURE 1.1



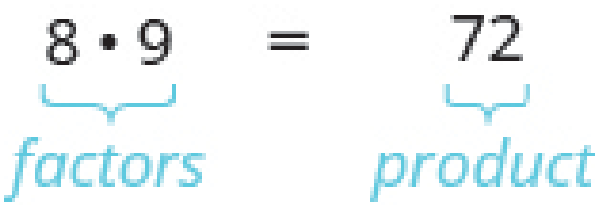
This hand may change someone's life. Amazingly, it was created using a special kind of printer known as a 3D printer. (credit: U.S. Food and Drug Administration/Wikimedia Commons)

Multiples of 2:

2,	4,	6,	8,	10,	12, ...
$2 \cdot 1$	$2 \cdot 2$	$2 \cdot 3$	$2 \cdot 4$	$2 \cdot 5$	$2 \cdot 6$

Multiples of 3:

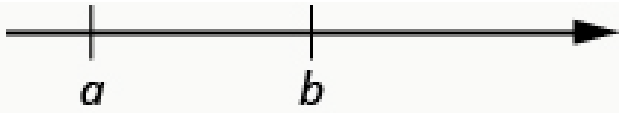
3,	6,	9,	12,	15,	18, ...
$3 \cdot 1$	$3 \cdot 2$	$3 \cdot 3$	$3 \cdot 4$	$3 \cdot 5$	$3 \cdot 6$


8 • 9 = 72
factors
product

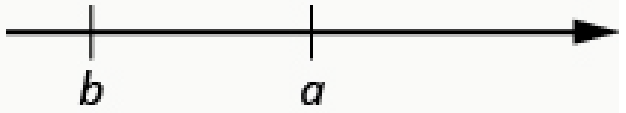
Number	Factors	Prime or Composite?
2	1,2	Prime
3	1,3	Prime
4	1,2,4	Composite
5	1,5	Prime
6	1,2,3,6	Composite
7	1,7	Prime
8	1,2,4,8	Composite
9	1,3,9	Composite
10	1,2,5,10	Composite
11	1,11	Prime

Number	Factors	Prime or Composite?
12	1,2,3,4,6,12	Composite
13	1,13	Prime
14	1,2,7,14	Composite
15	1,3,5,15	Composite
16	1,2,4,8,16	Composite
17	1,17	Prime
18	1,2,3,6,9,18	Composite
19	1,19	Prime
20	1,2,4,5,10,20	Composite

$a < b$ is read "a is less than b"
a is to the left of b on the number line

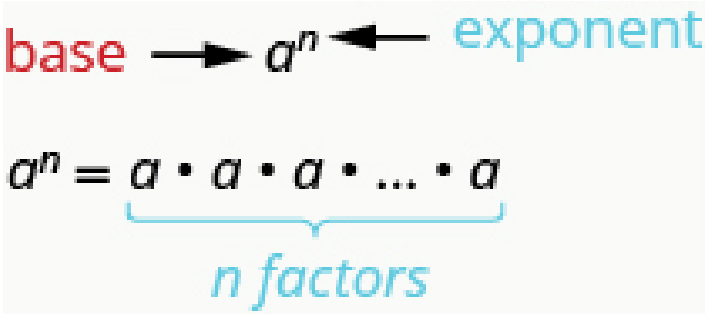


$a > b$ is read "a is greater than b"
a is to the right of b on the number line



means multiply 2 by itself, three times, as in $2 \cdot 2 \cdot 2$.

We read 2^3 as “two to the third power” or “two cubed.”


base
a^n
exponent
$a^n = a \cdot a \cdot a \cdot \ldots \cdot a$
n factors

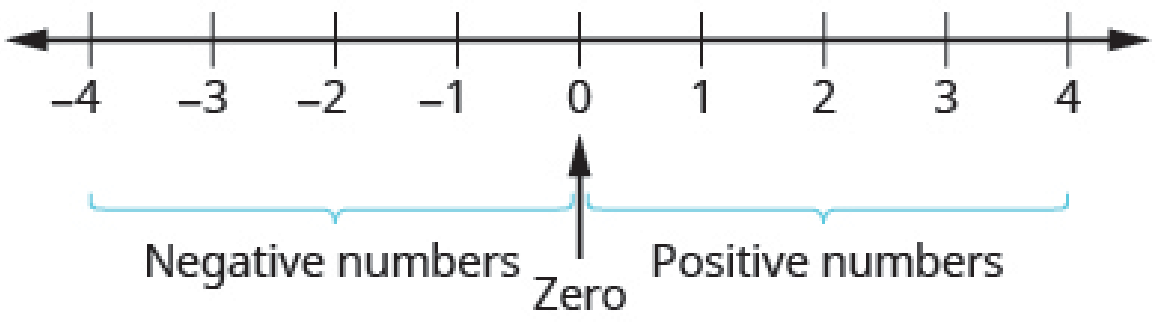
the **sum** *of a and b*

the **difference** *of a and b*

the **product** *of a and b*

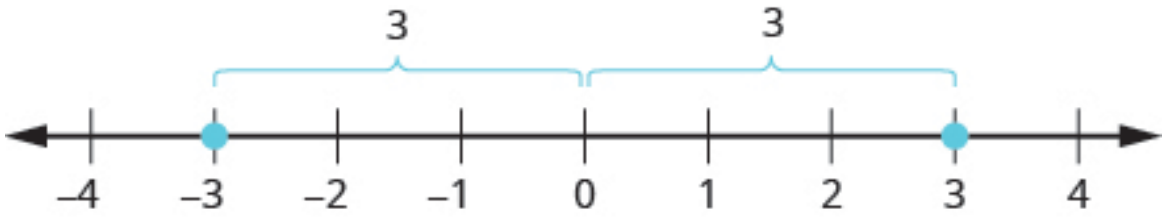
the **quotient** *of a and b*

FIGURE 1.2



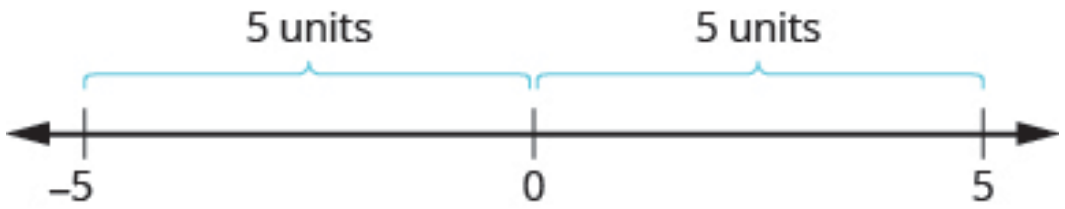
The number line shows the location of positive and negative numbers.

FIGURE 1.3

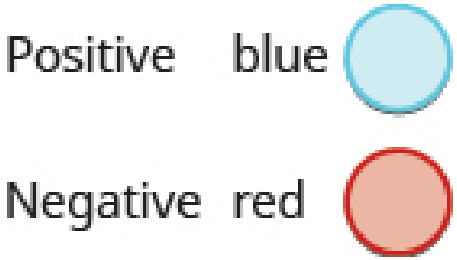


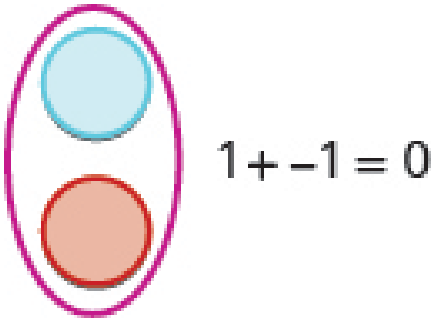
The opposite of 3 is −3.

FIGURE 1.4



The numbers 5 and −5 are 5 units away from 0.


Positive blue
Negative red


1 + −1 = 0

$5 + 3$

8 positives

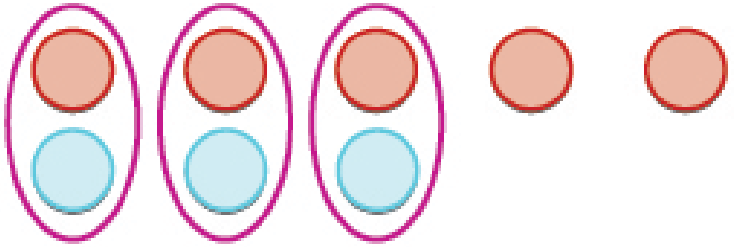
$5 + 3 = 8$

$-5 + (-3)$

8 negatives

$-5 + (-3) = -8$

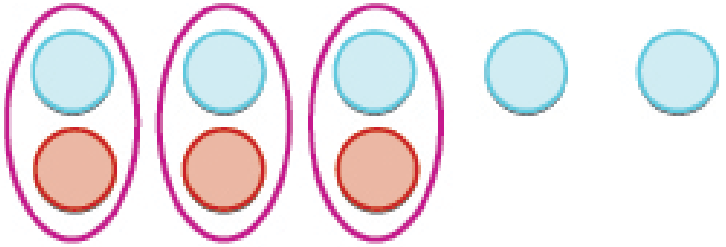
$-5 + 3$



More negatives – the sum is negative.

$-5 + 3 = -2$

$5 + (-3)$

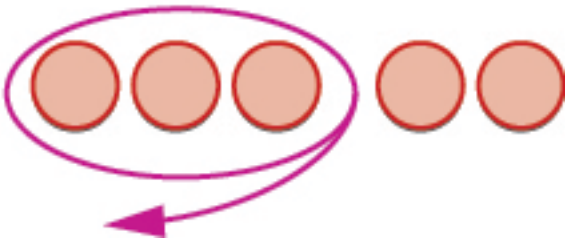


More positives – the sum is positive.

$5 + (-3) = 2$

$5 - 3 = 2$

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



$5 \cdot 3$

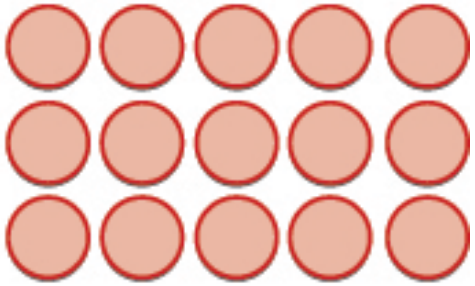
add 5, 3 times

15 positives

$5 \cdot 3 = 15$

$-5(3)$

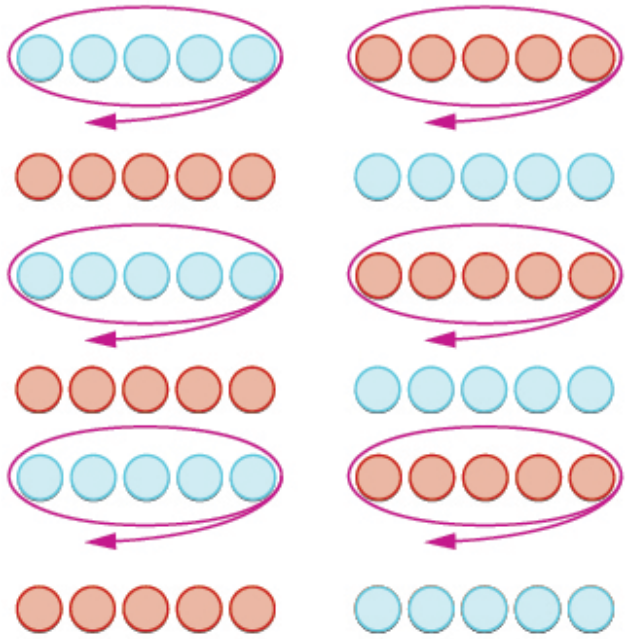
add -5, 3 times



15 negatives

$-5(3) = -15$

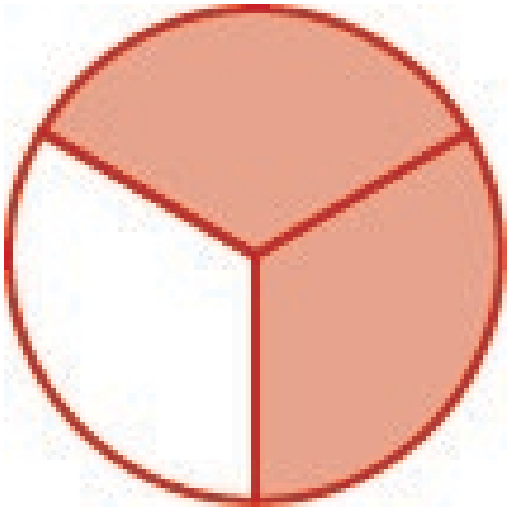
5(–3)	(–5)(–3)
take away 5, 3 times	take away –5, 3 times



What's left?

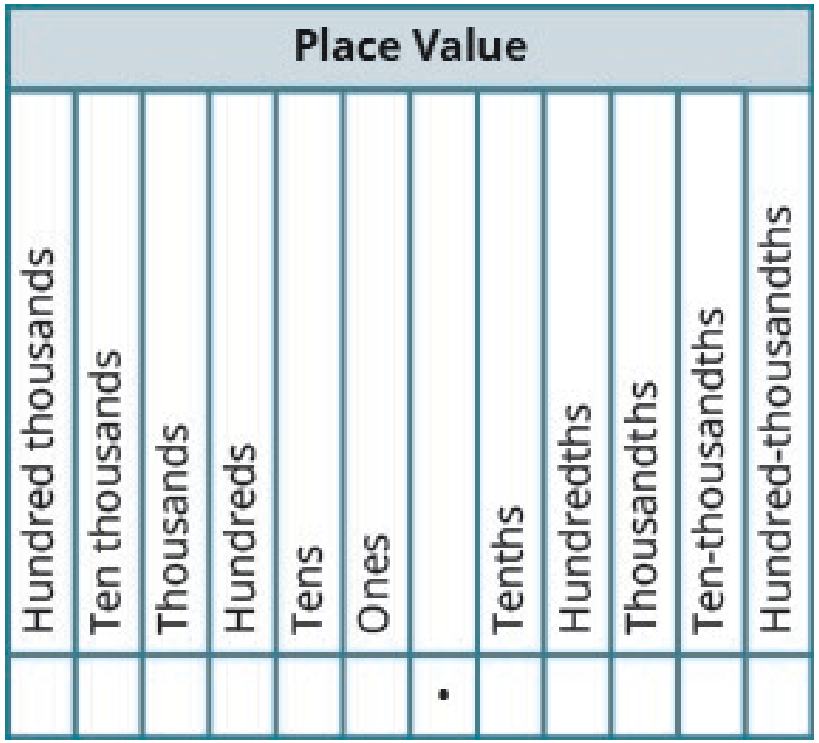
15 negatives	15 positives
5(–3) = –15	(–5)(–3) = 15

FIGURE 1.5



In the circle, $\frac{2}{3}$ of the circle is shaded—2 of the 3 equal parts.

FIGURE 1.6


Place Value
Hundred thousands
Ten thousands
Thousands
Hundreds
Tens
Ones
.
Tenths
Hundredths
Thousandths
Ten-thousandths
Hundred-thousandths

$$\underset{\text{dividend}}{a} \div \underset{\text{divisor}}{b} = \underset{\text{quotient}}{c}$$

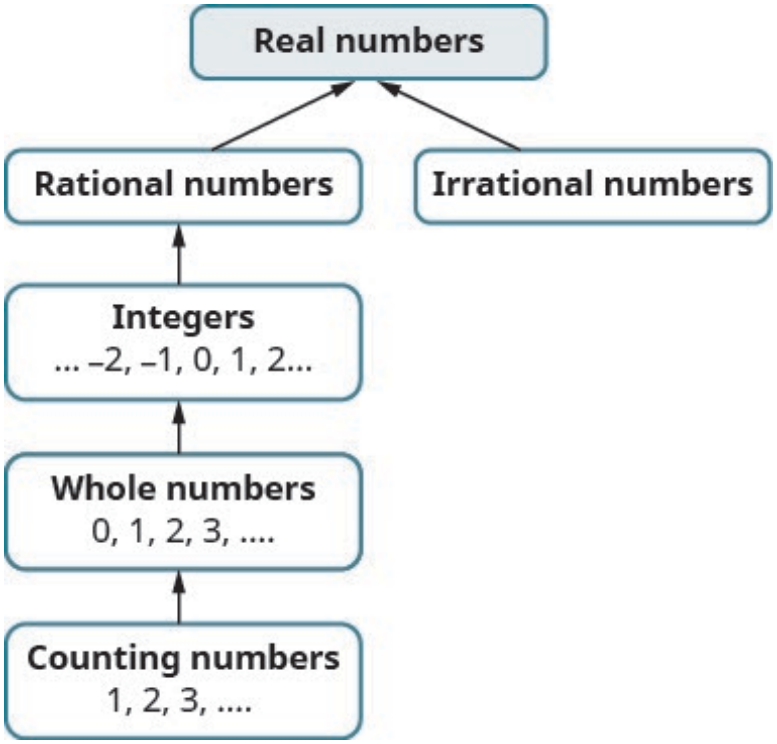
$$\begin{array}{r} \overset{\text{quotient}}{c} \\ \underset{\text{divisor}}{b}\,\overline{)\,\underset{\text{dividend}}{a}} \end{array}$$


6%
78%
2.7%
135%
0.06
0.78
0.027
1.35


0.05
0.83
1.05
0.075
0.3
5%
83%
105%
7.5%
30%

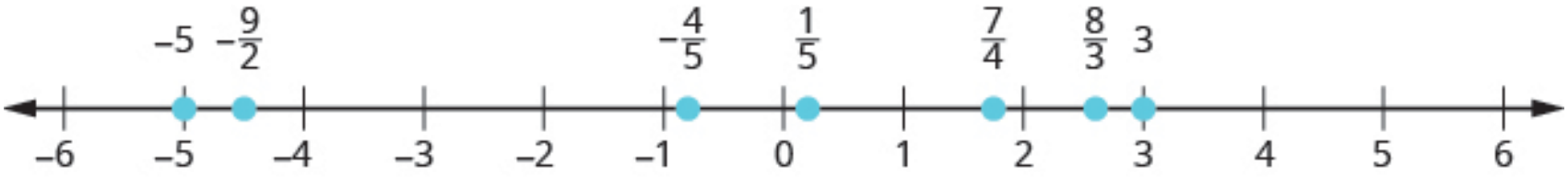

radical sign
$\sqrt{m}$
radicand

FIGURE 1.7



This chart shows the number sets that make up the set of real numbers.

FIGURE 1.8



$$5 + (-5) = 0$$

$$\frac{2}{3} \cdot \frac{3}{2} = 1$$

$4 \div 0 = \boxed{?}$ means $\boxed{?} \cdot 0 = 4$


3(x + 4)