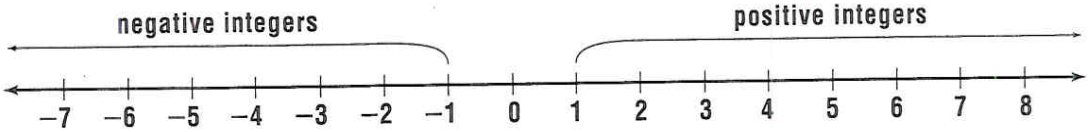
Name _____ Date _____

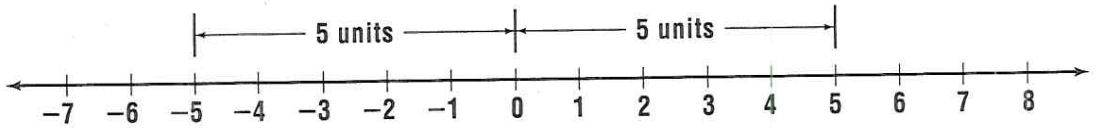
5-1 Study Guide

Integers

Integers greater than 0 are **positive integers.** Integers less than 0 are **negative integers.**



Two numbers are **opposites** if, on the number line, they are the same distance from 0, but on opposite sides of 0. The number line below shows that −5 and 5 are opposites.



The **absolute value** of an integer is its distance from 0 on the number line.

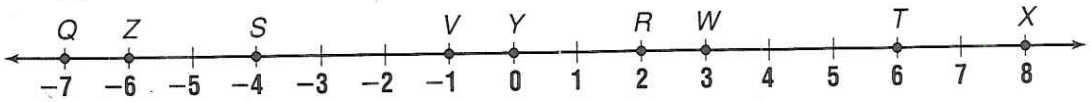
5 is 5 units from 0. The absolute value of 5 is 5. $|5| = 5$

−5 is 5 units from 0. The absolute value of −5 is 5. $|-5| = 5$

Write an integer for each situation.

1. 6°F below zero
2. a gain of 40 pounds
3. a profit of $4
4. a loss of 10 points
5. 68°F above zero
6. falling 3 feet

Write the integer represented by the point for each letter. Then find its opposite and its absolute value.



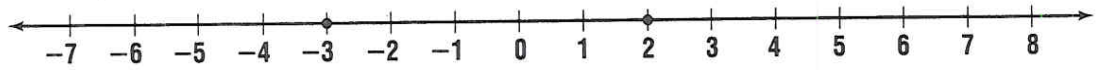
7. Q
8. R
9. S
10. T
11. V
12. W
13. X
14. Y
15. Z

Name _____ Date _____

5-2 Study Guide

Comparing and Ordering Integers

To compare or order integers, think of a number line. The number farther to the right on the number line is greater.



Since 2 is to the right of −3 on the number line, $-3 < 2$.

Examples **1** **Replace each ◯ with < or > to make a true sentence.**

-3 ◯ 3 Since a negative integer is always less than a positive integer, $-3 < 3$.

-2 ◯ -5 Since -2 is to the right of the -5 on the number line, $-2 > -5$.

2 **Order the integers 0, 3, −1, −3, and 5 from least to greatest.**

−3 is farthest to the left on the number line, so it is least.

Order the integers from left to right.
$-3, -1, 0, 3, 5$

Replace each ◯ with < or > to make a true sentence.

1. -5 ◯ 7
2. 0 ◯ -2
3. -8 ◯ 8
4. 1 ◯ -4
5. 17 ◯ 25
6. -12 ◯ -10

Order the integers from least to greatest.

7. 12, −4, 31, 0, −50, −12
8. 9, −7, 1, −5, 23, −11
9. −45, 62, −64, 45, −12, 17
10. −2, −14, −8, −19, −24, −1
11. −6, 5, 1, −8, 0, −7
12. −101, −102, −103, 101, 102, 103

Name _____ Date _____

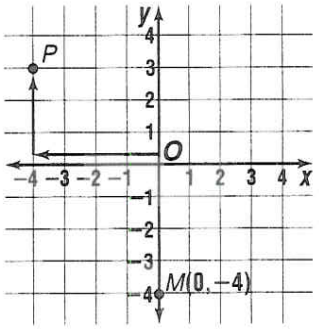
5-3 Study Guide

Integration: Geometry
The Coordinate System

The **coordinate system** is used to graph points in a plane. The horizontal line is the ***x*-axis.** The vertical line is the ***y*-axis.** Their intersection is the **origin.**

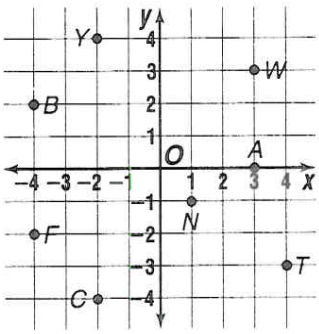
Points are located using **ordered pairs.** The first number in an ordered pair is the ***x*-coordinate;** the second number is the ***y*-coordinate.**

Examples **1** **Name the ordered pair for point *P*.**
Start at the origin.
Move 4 units left along the *x*-axis.
Move 3 units up on the *y*-axis.
The ordered pair for point *P* is $(-4, 3)$.



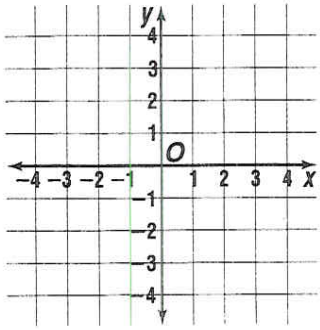
2 **Graph the point $M(0, -4)$.**
Start at the origin.
Move 0 units along the *x*-axis.
Move 4 units down on the *y*-axis.
Draw a point and label it *M*.

Name the x-coordinate and the y-coordinate for each point labeled at the right.



1. *B*
2. *T*
3. *W*
4. *C*
5. *F*
6. *N*
7. *A*
8. *Y*

Graph and label each point on the coordinate plane.



9. $H(-2, 1)$
10. $Q(0, 4)$
11. $D(4, 2)$
12. $E(4, -4)$
13. $G(-4, -4)$
14. $J(0, 0)$
15. $K(-4, 3)$
16. $M(-3, -2)$

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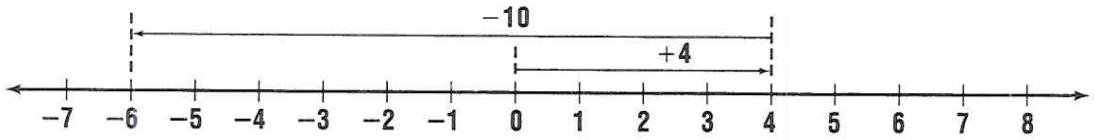
5-4 Study Guide

Adding Integers

To add integers, think of a number line. Locate the first addend on the number line. Move right if the second addend is positive. Move left if the second addend is negative.

Example 1 **Solve $t = 4 + (-10)$.**

Start at 0. Since 4 is positive, go 4 units to the right.
Since -10 is negative, go 10 units to the left.



So, $t = -6$.

When you add integers, remember the following.
The sum of two positive integers is positive.
The sum of two negative integers is negative.
The sum of a positive integer and a negative integer is:

- positive if the positive integer has the greater absolute value.
- negative if the negative integer has the greater absolute value.

Examples ***2*** **Solve $n = 14 + (-11)$.**

$|14| > |-11|$,
so the sum is positive.
$14 - 11 = 3$
So, $n = 3$.

3 **Solve $-24 + 16 = k$.**

$|-24| > |16|$,
so the sum is negative.
$24 - 16 = 8$
So, $k = -8$.

Solve each equation.

1. $p = 16 + (-11)$
2. $-22 + (-7) = g$
3. $y = -6 + 36$
4. $-50 + 50 = v$
5. $c = -10 + (-10)$
6. $k = 12 + 9$
7. $100 + (-25) = w$
8. $n = 38 + (-6)$
9. $-50 + (-20) = v$
10. $r = -89 + 29$
11. $85 + (-10) = t$
12. $4 + (-10) = z$

Evaluate each expression if a = 8, b = −8, and c = 4.

13. $a + 16$
14. $b + (-9)$
15. $b + c$
16. $-10 + c$
17. $a + (-21)$
18. $12 + b$

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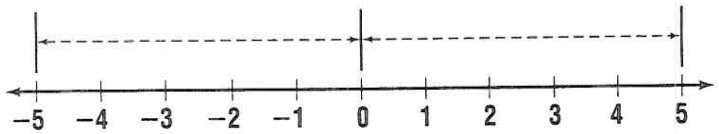
5-5 Study Guide

Subtracting Integers

An integer and its **opposite** are the same distance from 0 on a number line. The integers 5 and -5 are opposites.



The sum of an integer and its opposite is 0.

$$-5 + 5 = 0$$

To subtract an integer, add its opposite.

Examples **1** **Solve $t = 6 - 9$.**

$t = 6 + (-9)$ *To subtract 9, add -9.*

$t = -3$

2 **Solve $m = -10 - (-12)$.**

$m = -10 + 12$ *To subtract -12, add 12.*

$m = 2$

Solve each equation.

1. $b = 8 - 11$
2. $18 - (-5) = p$
3. $-10 - 4 = h$
4. $n = -8 - (-6)$
5. $v = -15 - 40$
6. $x = 25 - (-13)$
7. $51 - (-26) = k$
8. $-30 - (-52) = a$
9. $95 - 101 = m$
10. $j = -75 - 50$
11. $r = 5 - 55$
12. $19 - (-10) = y$

Evaluate each expression if $m = -1$, $n = 10$, and $p = 6$.

13. $m - 8$
14. $10 - m$
15. $-n - p$
16. $n - m$
17. $p - (-m)$
18. $-25 - p$

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5-6 Study Guide

Multiplying Integers

The product of two positive integers is positive.

Examples

Solve $m = 5(8)$.
$m = 40$

Solve $n = 4(5)(6)$.
$n = 20(6)$
$n = 120$

Solve $p = (2)(8)(1)$.
$p = 16(1)$
$p = 16$

The product of two negative integers is positive.

Examples

Solve $y = (-6)(-9)$.
$y = 54$

Solve $x = (-7)^2$.
$x = (-7)(-7)$
$x = 49$

Solve $z = (-3)(-5)(2)$.
$z = 15(2)$
$z = 30$

The product of a positive integer and a negative integer is negative.

Examples

Solve $d = (-4)(7)$.
$d = -28$

Solve $e = (10)(-5)(3)$.
$e = -50(3)$
$e = -150$

Solve $f = (-9)(2)^2$.
$f = (-9)(4)$
$f = -36$

Solve each equation.

1. $-7(-8) = p$
2. $10(-6) = j$
3. $a = -9(3)$
4. $(-8)^2 = k$
5. $m = (-12)(-12)$
6. $20(-20) = v$
7. $t = (-25)(4)$
8. $15(30) = c$
9. $h = 2(-2)(2)$

Evaluate each expression if x = −3, y = −10, a = 2, and b = 6.

10. $-8a$
11. $9x$
12. xy
13. ab
14. $3xa$
15. $-10by$
16. $-abx$
17. x^2
18. $25y$

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5-7 Study Guide

Dividing Integers

If two integers have the same sign, their quotient is positive.

Examples **1** Solve $k = 560 \div 8$.
$k = 70$
The signs are the same.
The quotient is positive.

2 Solve $h = -120 \div (-6)$.
$h = 20$
The signs are the same.
The quotient is positive.

If two integers have different signs, their quotient is negative.

Examples **3** Solve $a = -75 \div 5$.
$a = -15$
The dividend is negative.
The divisor is positive.
The quotient is negative.

4 Solve $b = 99 \div (-33)$.
$b = -3$
The dividend is positive.
The divisor is negative.
The quotient is negative.

Solve each equation.

1. $y = 64 \div (-8)$
2. $-100 \div 4 = c$
3. $f = -250 \div (-5)$
4. $60 \div (-12) = x$
5. $-90 \div (-10) = u$
6. $-88 \div 4 = k$
7. $375 \div (-25) = g$
8. $t = -960 \div (-3)$
9. $r = 700 \div 35$

Evaluate each expression if r = −96, t = −8, and v = 2.

10. $\frac{r}{t}$
11. $\frac{t}{v}$
12. $\frac{-4r}{t}$
13. $\frac{t^2}{v}$
14. $\frac{728}{t}$
15. $\frac{tv}{4}$
16. $\frac{r}{-48}$
17. $\frac{4t}{v}$
18. $\frac{r}{tv}$

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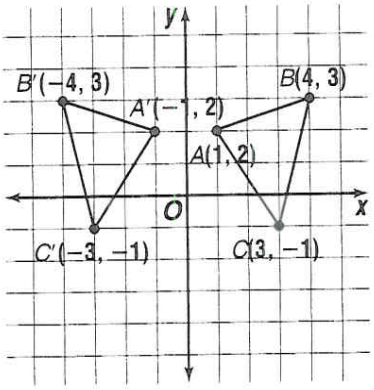
5-8 Study Guide

Integration: Geometry
Graphing Transformations

One kind of transformation is a **reflection.** A reflection is a flip.
Multiply the x-coordinate by -1 to reflect over the y-axis.
Multiply the y-coordinate by -1 to reflect over the x-axis.

Example 1 **$\triangle ABC$ has vertices $A(1, 2)$, $B(4, 3)$ and $C(3, -1)$. Graph its reflection over the y-axis.**

Multiply each x-coordinate by -1.
$A(1, 2) \rightarrow A'(-1, 2)$
$B(4, 3) \rightarrow B'(-4, 3)$
$C(3, -1) \rightarrow C'(-3, -1)$

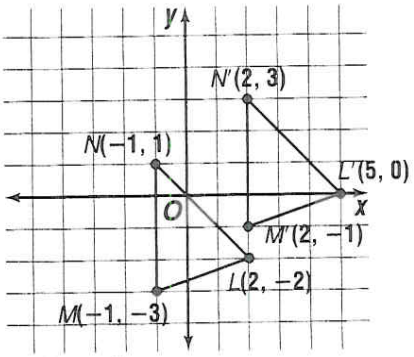


Another type of transformation is a **translation.** A translation is a slide.

Example 2 **$\triangle LMN$ has vertices $L(2, -2)$, $M(-1, -3)$ and $N(-1, 1)$. Translate $\triangle LMN$ 2 units up and 3 units right.**

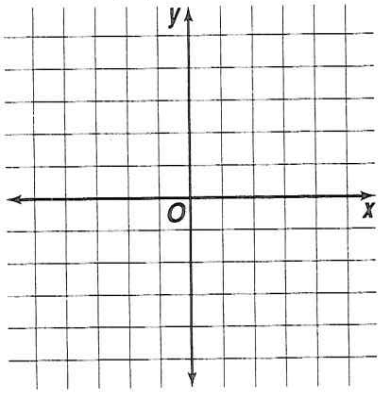
Add 3 to each x-coordinate. Add 2 to each y-coordinate.

$L(2, -2) \rightarrow (2 + 3, -2 + 2) \rightarrow L'(5, 0)$
$M(-1, -3) \rightarrow (-1 + 3, -3 + 2) \rightarrow M'(2, -1)$
$N(-1, 1) \rightarrow (-1 + 3, 1 + 2) \rightarrow N'(2, 3)$



Graph each triangle and its transformation. Write the ordered pairs for the vertices of the new triangle.

1. $\triangle DEF$ with vertices $D(1, 2)$, $E(5, 3)$ and $F(5, 0)$ reflected over the y-axis



2. $\triangle QRS$ with vertices $Q(-6, -2)$, $R(-1, 0)$ and $S(-1, 3)$ translated 1 unit up and 7 units right