

8. [Integers]

Skill 8.1 Adding integers.

MMMaive 1 1 2 2 3 3 4 4
MMLime 1 1 2 2 3 3 4 4

To add two integers with the same sign:

- Add their absolute values.
- Use the plus sign if both integers are positive.
- Use the minus sign if both integers are negative.

Examples: $-9 + (-3)$ *add, use “-”*
 $= -12$
 $9 + 3$ *add, use “+”*
 $= 12$

To add two integers with different signs:

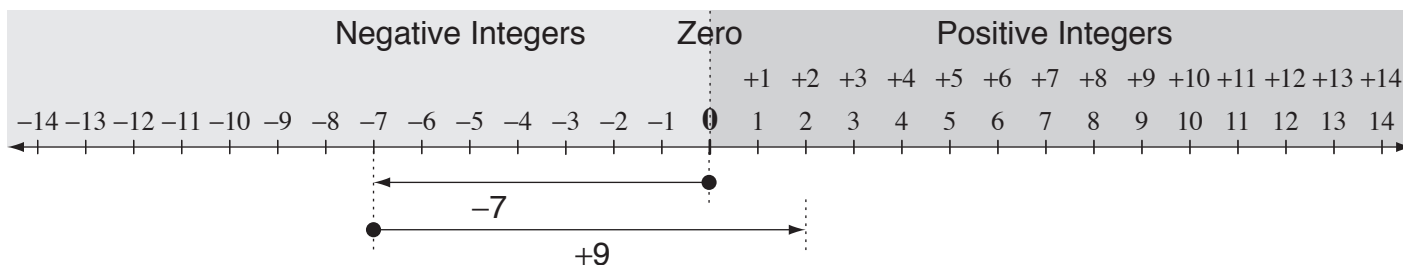
- Subtract their absolute values.
- Use the plus sign if the positive integer’s absolute value is greater.
- Use the minus sign if the negative integer’s absolute value is greater.

Examples: $-9 + 3$ *subtract, use “-”*
 $= -6$
 $9 + (-3)$ *subtract, use “+”*
 $= 6$

Hint: Every number has a sign attached to it, so if there is no sign, the number is positive.

- The sign can also be visualized using a number line.

Hint: ‘-’ means move left or backwards and ‘+’ means move right or forwards.



Q. $-7 + 9 =$

start at -7, move forward 9

A. $-7 + 9$

$= 2$

Subtract $|-7|$ from $|9|$ $9 - 7 = 2$

The sum is positive because $|9| \geq |-7|$

a) $5 + (-7) =$ *subtract, use “-”*

b) $-4 + (-8) =$

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

d) $2 + (-8) =$

e) $-4 + (-6) =$

f) $-7 + 4 =$

g) $-3 + 6 =$

h) $5 + (-8) =$

i) $-2 + (-14) =$

j) $-16 + (-9) =$

k) $-15 + (-8) =$

l) $2 + 7 =$

m) $7 + 15 =$

n) $-17 + 9 =$

o) $7 + (-13) =$

p) $12 + (-13) =$

q) $-11 + (-6) =$

r) $-16 + (-7) =$

Skill 8.2 Subtracting integers.

- Consider subtracting an integer as adding its opposite. (see skill 8.1, page 89)

To subtract a positive integer:

Examples: $-9 - 3$ *subtract 3 means add -3*
 $= -9 + (-3)$ *add, use "-"*
 $= -12$
 $9 - 3$
 $= 9 + (-3)$ *subtract, use "+"*
 $= 6$

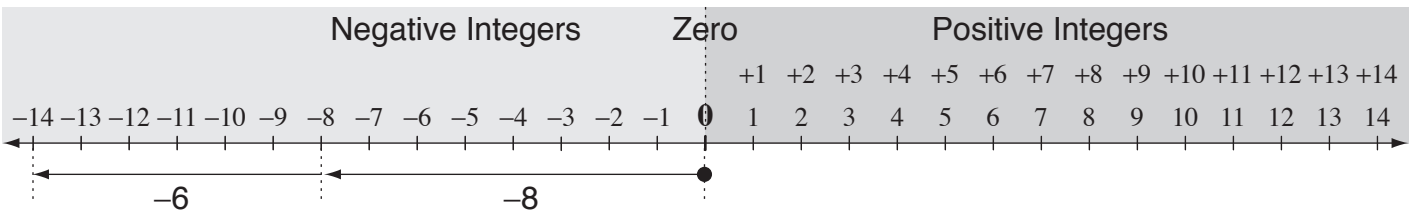
To subtract a negative integer:

Examples: $-9 - (-3)$ *subtract -3 means add 3*
 $= -9 + 3$ *subtract, use "-"*
 $= -6$
 $9 - (-3)$
 $= 9 + 3$ *add, use "+"*
 $= 12$

Hint: Every number has a sign attached to it, so if there is no sign, the number is positive.

- The sign of the result of the subtraction can also be visualised using a number line.

Hint: '-' means move left or backwards and '+' means move right or forwards.



Q. $-8 - 6 =$

start at -8, move backward 6

A. $-8 - 6$

$= -8 + (-6)$
 $= -14$

Subtract 6 means add -6

Add their absolute values. $|-8| + |-6| = 14$
 Use the minus sign.

a) $-5 - (-6) =$ *subtract -6 means add 6*
 $= -5 + 6 =$

b) $3 - 9 =$ *subtract 9 means add -9*
 $= 3 + (-9) =$

c) $7 - 8 =$ *subtract, use "-"*
 $=$

d) $7 - (-7) =$
 $=$

e) $-3 - (-2) =$
 $=$

f) $-4 - (-8) =$
 $=$

g) $6 - (-7) =$
 $=$

h) $4 - (-9) =$
 $=$

i) $-19 - 11 =$
 $=$

j) $-16 - 9 =$
 $=$

k) $-12 - (-15) =$
 $=$

l) $-6 - (-3) =$
 $=$

m) $4 - 16 =$
 $=$

n) $-11 - 13 =$
 $=$

o) $6 - (-14) =$
 $=$

Skill 8.3 Multiplying integers.

- Multiply the signs first, then multiply the numbers.
- When multiplying integers use these rules for the signs:

If same: $++ = +$
 $-- = +$

If different: $+- = -$
 $-+ = -$

Example: $-9 \times (-3) = 27$ *(---+)*

Example: $9 \times (-3) = -27$ *(+---)*

Hint: When multiplying more than 2 integers, you can start with any pair that makes the multiplication easier.

Q. $2 \times (-9) =$

A. $2 \times (-9) = -18$ *(+---)*

a) $-3 \times 8 =$ *(-+---)*

-24

b) $-3 \times (-4) =$

c) $5 \times (-9) =$

d) $-10 \times 10 =$

e) $-2 \times 6 =$

f) $-4 \times (-7) =$

g) $7 \times (-3) =$

h) $4 \times (-5) =$

i) $8 \times 8 =$

j) $2 \times (-17) =$

k) $-3 \times (-15) =$

l) $-21 \times (-2) =$

m) $-13 \times (-4) =$

n) $-10 \times 11 =$

o) $6 \times (-20) =$

p) $-5 \times (-2) \times 7 =$ *(---+)*

$= 10 \times 7 =$ **70**

q) $3 \times (-4) \times (-2) =$

$=$

r) $-5 \times 3 \times 3 =$

$=$

s) $-4 \times 4 \times (-2) =$

$=$

t) $-6 \times (-6) \times (-10) =$

$=$

u) $20 \times (-5) \times 3 =$

$=$

v) $-10 \times (-8) \times 5 =$

$=$

w) $7 \times (-3) \times (-30) =$

$=$

x) $12 \times 3 \times (-5) =$

$=$

Skill 8.4 Dividing integers.

- Divide the signs first, then divide the numbers.
- When dividing integers use these rules for the signs:

If same: $++ = +$
 $-- = +$

If different: $+- = -$
 $-+ = -$

Example: $-9 \div (-3) = 3$
(---=+)

Example: $9 \div (-3) = -3$
(+---)

Hint: Fractions are divisions. Divide the numerator (top) by the denominator (bottom).

Q. $(+12) \div (-3) =$

A. $12 \div (-3) = -4$
(+---)

a) $-18 \div 9 =$ (-+ = -) b) $-6 \div 1 =$ c) $12 \div (-4) =$

d) $-15 \div (-3) =$ e) $-24 \div 6 =$ f) $9 \div 9 =$

g) $35 \div (-5) =$ h) $-27 \div 3 =$ i) $-28 \div (-7) =$

j) $-36 \div (-3) =$ k) $-45 \div 3 =$ l) $75 \div (-5) =$

m) $-108 \div 9 \div 3 =$ n) $-28 \div (-2) \div 2 =$ o) $132 \div (-3) \div 4 =$

p) $\frac{32}{-4} =$ (division) q) $\frac{-15}{-3} =$ r) $\frac{-42}{7} =$

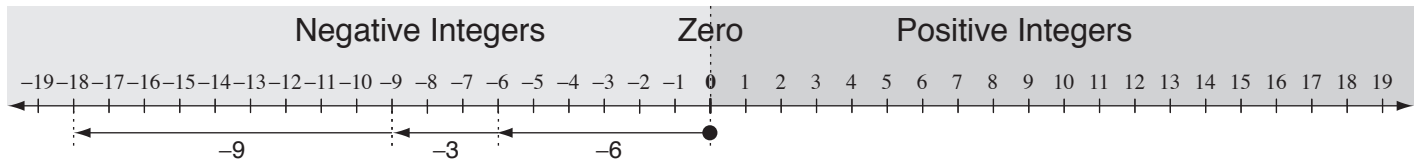
s) $\frac{70}{-5} =$ t) $\frac{-30}{-6} =$ u) $\frac{-72}{9} =$

v) $\frac{110}{-5} =$ w) $\frac{-250}{-10} =$ x) $\frac{-300}{6} =$

Skill 8.5 Adding and subtracting integers.

MM Mauve 11 22 33 44
 ML Lime 11 22 33 44

- Add and/or subtract from left to right. (see skill 8.1, page 89 and skill 8.2, page 90)
- The sign of the result can also be visualized using a number line.



Q. $-6 - 3 - 9 =$

A. $-6 - 3 - 9$
 $= -6 + (-3) + (-9)$
 $= -9 + (-9)$
 $= -18$

make subtraction an addition
work from left to right
start at -9, move backward 9 more

a) $-5 + (-6) + 9 =$
 $= -11 + 9 = \boxed{-2}$

add, use "-"
subtract, use "-"

b) $1 - (-7) - (-7) =$
 $= 1 + \dots = \dots$

c) $9 + (-6) - (-2) =$
 $= \dots = \dots$

d) $-8 - (-5) + 4 =$
 $= \dots = \dots$

e) $-2 + (-6) - (-9) =$
 $= \dots = \dots$

f) $5 - 7 - (-8) =$
 $= \dots = \dots$

g) $3 - (-6) + (-8) =$
 $= \dots = \dots$

h) $5 + (-4) - 3 =$
 $= \dots = \dots$

i) $-2 - (-6) - 7 =$
 $= \dots = \dots$

j) $8 - 2 - (-7) =$
 $= \dots = \dots$

k) $-12 - (-13) + 15 =$
 $= \dots = \dots$

l) $-14 - 16 + 18 =$
 $= \dots = \dots$

m) $7 + 15 + (-19) =$
 $= \dots = \dots$

n) $5 + (-7) + (-9) =$
 $= \dots = \dots$

o) $-6 + 5 + (-8) =$
 $= \dots = \dots$

Skill 8.6 Multiplying and dividing integers.

MMMaive 11 22 33 44
MMLime 11 22 33 44

- Multiply and/or divide from left to right. (see skill 8.3, page 91 and skill 8.4, page 92)
- When multiplying and dividing integers use these rules for the signs:

If same: $++ = +$
 $-- = +$

If different: $+- = -$
 $-+ = -$

Q. $10 \div (-2) \times (-7) =$

A. $10 \div (-2) \times (-7)$ — *work from left to right*
 $\overset{+---}{=} -5 \times (-7)$ — $---=+$
 $= 35$

a) $-4 \times 5 \div 5 =$

$= -20 \div 5 = \boxed{-4}$

b) $10 \times (-3) \div (-5) =$

$= \dots = \boxed{}$

c) $15 \div 3 \times (-3) =$

$= \dots = \boxed{}$

d) $-8 \times (-2) \div 4 =$

$= \dots = \boxed{}$

e) $24 \div (-6) \div (-2) =$

$= \dots = \boxed{}$

f) $-5 \times (-4) \div (-10) =$

$= \dots = \boxed{}$

g) $30 \div (-10) \div 3 =$

$= \dots = \boxed{}$

h) $28 \div (-14) \times (-7) =$

$= \dots = \boxed{}$

i) $-2 \times (-150) \div 20 =$

$= \dots = \boxed{}$

j) $7 \times 6 \div (-21) =$

$= \dots = \boxed{}$

k) $-2 \times 32 \div 8 =$

$= \dots = \boxed{}$

l) $-35 \div (-7) \times 9 =$

$= \dots = \boxed{}$

m) $-5 \times (-4) \div 2 =$

$= \dots = \boxed{}$

n) $16 \div 4 \times (-3) =$

$= \dots = \boxed{}$

o) $-35 \div (-5) \times (-8) =$

$= \dots = \boxed{}$

p) $9 \times (-10) \div 5 =$

$= \dots = \boxed{}$

q) $-40 \div 4 \times (-11) =$

$= \dots = \boxed{}$

r) $11 \times 6 \div (-3) =$

$= \dots = \boxed{}$

s) $10 \times 3 \div (-5) =$

$= \dots = \boxed{}$

t) $24 \div (-4) \times (-4) =$

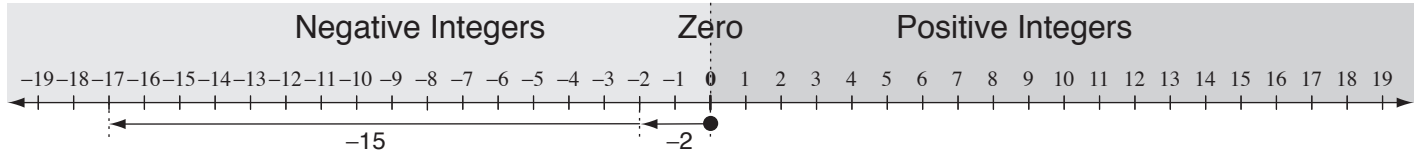
$= \dots = \boxed{}$

u) $-6 \times 8 \div (-12) =$

$= \dots = \boxed{}$

Skill 8.7 Adding and subtracting integers using order of operations.

- Complete the operations in the correct order.
 - Simplify within brackets.
 - Add and/or subtract from left to right.
- Consider adding integer rules. (see skill 8.1, page 89)
- Consider subtracting an integer as adding its opposite. (see skill 8.1, page 89 and skill 8.2, page 90)
- The sign of the result can also be visualised using a number line.



Q. $(5 - 7) - (6 + 9) =$

A. $(5 - 7) - (6 + 9)$ — complete the brackets first
 $= (-2) - (15)$
 $= -2 - 15$ — start at -2, move backward 15 more
 $= -17$

a) $4 + (-6 + 3) =$ — brackets first
 $= 4 + (-3)$ — subtract, use “-”
 $= 4 - 3 = \boxed{1}$
 — subtract, use “+”

b) $2 + (4 - 9) =$
 $= 2 + (-5)$
 $= \underline{\hspace{2cm}} = \boxed{\hspace{1cm}}$

c) $7 + (3 - 8) =$
 $= \underline{\hspace{2cm}} = \boxed{\hspace{1cm}}$

d) $4 - (9 - 7) =$
 $= \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}} = \boxed{\hspace{1cm}}$

e) $5 - (-8 + 6) =$
 $= \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}} = \boxed{\hspace{1cm}}$

f) $6 + (-5 - 4) =$
 $= \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}} = \boxed{\hspace{1cm}}$

g) $(2 - 5) - (3 + 4) =$
 $= -3 - 7$ — subtract 7 means add -7
 $= -3 + (-7) = \boxed{\hspace{1cm}}$ — add, use “-”

h) $(8 - 4) + (3 - 9) =$
 $= \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}} = \boxed{\hspace{1cm}}$

i) $(5 - 9) - (9 - 5) =$
 $= \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}} = \boxed{\hspace{1cm}}$

j) $(5 + 6) - (4 - 11) =$
 $= \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}} = \boxed{\hspace{1cm}}$

k) $(3 - 8) + (9 - 14) =$
 $= \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}} = \boxed{\hspace{1cm}}$

l) $(-8 - 6) - (7 - 13) =$
 $= \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}} = \boxed{\hspace{1cm}}$

Skill 8.8 Multiplying and dividing integers using order of operations.

MMMaive 11 22 33 44
MMLime 11 22 33 44

- Complete the operations in the correct order.
 - Simplify within brackets.
 - Multiply and/or divide from left to right.
- When multiplying or dividing integers use these rules for the signs:

If same: $++ = +$
 $-- = +$

If different: $+- = -$
 $-+ = -$

Q. $(6 + 4) \times (-6 - 4) =$

A. $(6 + 4) \times (-6 - 4)$ *brackets first*
 $= 10 \times -10$
 $= -100$ *+--=-*

a) $(3 + 3) \times (-4 + 9) =$

$= 6 \times 5 = \boxed{30}$

b) $(2 + 4) \times (-6 + 4) =$

$= \dots = \boxed{}$

c) $(8 - 4) \times (6 - 9) =$

$= \dots = \boxed{}$

d) $(-1 - 7) \times (3 - 9) =$

$= \dots = \boxed{}$

e) $(5 + 4) \times (-5 - 4) =$

$= \dots = \boxed{}$

f) $(-4 - 3) \times (-1 + 4) =$

$= \dots = \boxed{}$

g) $(-4 - 7) \times (-3 + 8) =$

$= \dots = \boxed{}$

h) $(3 - 7) \times (-7 - 3) =$

$= \dots = \boxed{}$

i) $(-9 + 2) \times (7 + 5) =$

$= \dots = \boxed{}$

j) $\frac{7-1}{2-5}$ *division*
 $= \frac{6}{-3}$

$= 6 \div -3 = \boxed{}$

k) $\frac{5-8}{-5+8}$

$= \dots = \boxed{}$

l) $\frac{-40}{-2 \times 5}$

$= \dots = \boxed{}$

m) $\frac{8-2}{2-5}$

$= \dots = \boxed{}$

n) $\frac{2-9}{-2+9}$

$= \dots = \boxed{}$

o) $\frac{36}{-3 \times 8}$

$= \dots = \boxed{}$