*I can use **variables** to represent **integers**.*

Variable: a letter that represents a number

To test your knowledge of adding and subtracting rational numbers, you may see problems with variables.

When you have multiple variables that are not given, choose numbers that satisfy the conditions.

Example 1:

$a + b = c$

If $a > 0$ and $c < 0$, what must be true about b?

Choose numbers for a and c.

$a = 5$

$c = -3$

$a + b = c$

$5 + b = -3$

$b = -8$

A. $b > 0$

(B.) $b < 0$

C. $b = 0$

D. $b = c$

Example 2:

$c - d = e$

If $c > 0$ and $d < 0$, what must be true about e?

Choose numbers for c and d.

$c = 5$

$d = -3$

$c - d = e$

$5 - (-3) = e$

$8 = e$

A. $e < 0$

B. $e = d$

C. $e = 0$

(D.) $e > c$

Example 3:

$a - b = c$

If $a > c$, what must be true about b?

Choose numbers for a and c.

$a = 5$

$c = -3$

$a - b = c$

$5 - b = -3$

$8 = b$

(A.) $b > 0$

B. $b < 0$

C. $b = 0$

D. $b = c$

Example 4:

$x + y > 0$

If $y < 0$, what must be true about x?

Choose a number for y.

$y = -8$

$x + y > 0$

$x + (-8) > 0$

A. $x < 0$ and $x > |y|$

(B.) $x > 0$ and $x > |y|$

C. $x < 0$ and $x < |y|$

D. $x > 0$ and $x < |y|$

Remember... Subtracting a value is the same as adding the opposite.

Rewrite each subtraction expression as an addition expression.

a. $a - b$ $a + (-b)$ b. $-c - d$ $-c + (-d)$

Example 1:

$a + 4 = a - b$

What must be true about b?

A. $b = 4$
B. $b = -4$
C. $b = 1$
D. $b = -1$

Example 2:

$c - d = c + 3$

What must be true about d?

A. $d = 3$
B. $d = -3$
C. $d = 1$
D. $d = -1$

Example 3:

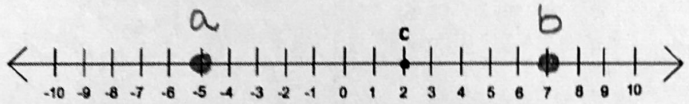
$a - 45 = a + b$

What must be true about b?

A. $b = 45$
B. $b = -45$
C. $b = a$
D. $b = -1$

Example 4: An equation is shown, where $a < 0$ and $c > 0$. $a + b = c$

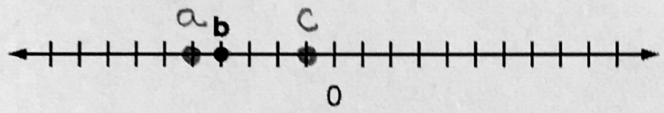
Plot two points on the number line to show the locations of a and b.



$-5 + b = 2$
↑
7

Example 5: An equation is shown, where $b < 0$ and $c < 0$. $a - b = c$

Plot two points on the number line to show the locations of a and c.



$a - (-4) = -1$
↑
-5

Using Additive Inverse to Solve for a Variable

Additive Inverse: What you add to a number to get zero.

Example 1:

Solve for x.

$17 + x + 10 - (-3) + (-12) = 0$

$17 + x + 10 + 3 + (-12) = 0$

$30 + (-12) + x = 0$

$18 + x = 0$

$x = -18$

Example 2:

Solve for x.

$12 + x + (-3) - 7 + (-15) - (-2) = 0$

$12 + x + (-3) + (-7) + (-15) + 2 = 0$

$14 + (-25) + x = 0$

$-11 + x = 0$

$x = 11$

Example 3: Pete plays golf every weekend during the spring. He plays well enough to get close to par every round. His differential from par over the past 8 weeks has been +2, +3, -2, +1, -1, +1, -3, +2. What will he have to score on the ninth week in order to be at par(0) for the nine week period?

$9 + (-6) + x = 0$

$3 + x = 0$ $x = -3$