right 3   right 5
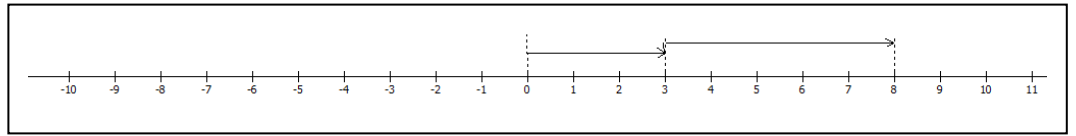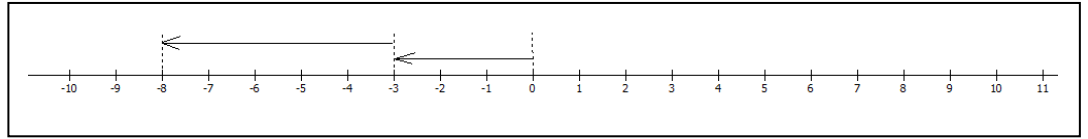
$$3 + 5 = 8$$
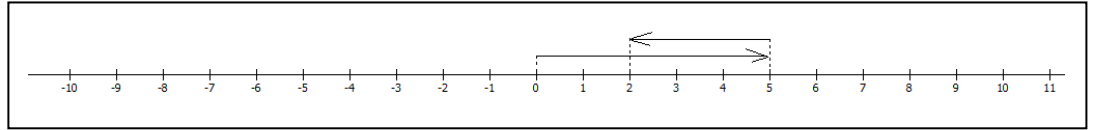

left 3   left 5

$$^-3 - 5 = {}^-8$$

right 5   left 3

$$5 - 3 = 2$$

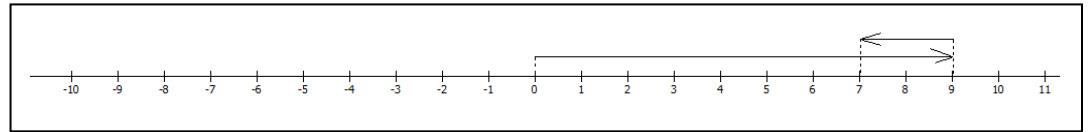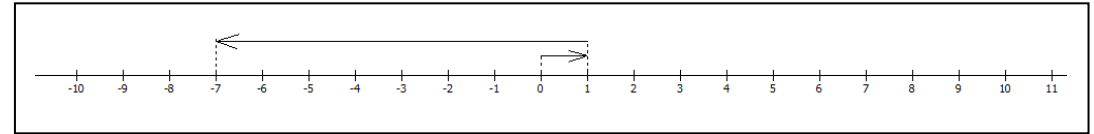*right 3   left 5*

$$3 - 5 = {}^-2$$
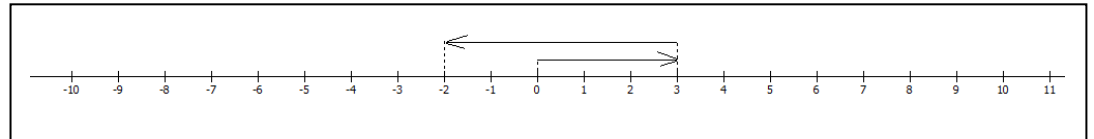
$$9 + (^-2) = 7$$
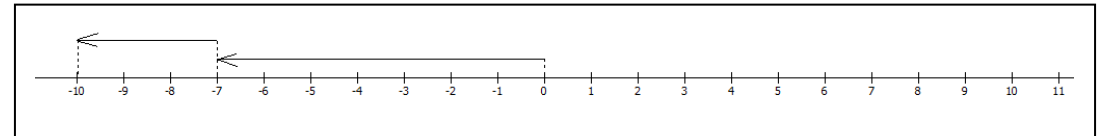$$9 - 2 = 7$$

$$1 + (^-8) = {}^-7$$
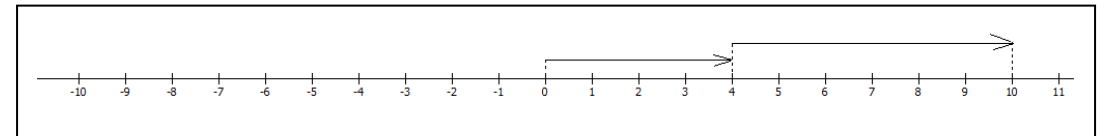$$1 - 8 = {}^-7$$

$$^-7 + (^-3) = {}^-10$$
$$^-7 - 3 = {}^-10$$

$$4 - (^-6) = 10$$
$$4 + 6 = 10$$

$$^-10 - (^-8) = {}^-2$$
$$^-10 + 8 = {}^-2$$
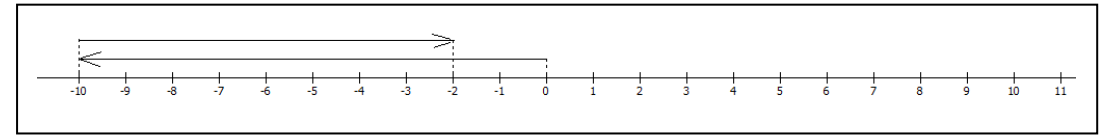
$$^-10 - (^-14) = 4$$
$$^-10 + 14 = 4$$

$$- \left({}^- ??? \right) \iff + ???$$
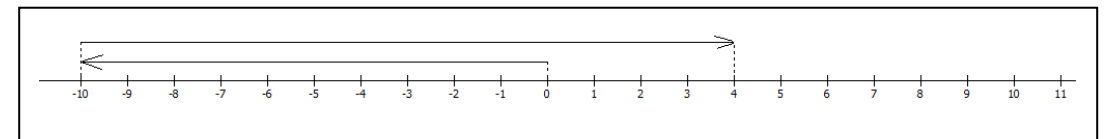
Gain

$$+ \left({}^- ??? \right) \iff - ???$$

Loss

$5+4=9$		$4+4=8$	$9-5=4$	$^-6-4={}^-10$	
$5+3=8$		$3+4=7$	$8-5=3$	$^-6-3={}^-9$	
$5+2=7$		$2+4=6$	$7-5=2$	$^-6-2={}^-8$	
$5+1=6$		$1+4=5$	$6-5=1$	$^-6-1={}^-7$	
$5+0=5$		$0+4=4$	$5-5=0$	$^-6-0={}^-6$	
$5+(^-1)=4$	$5-1=4$	$^-1+4=3$	$4-5={}^-1$	$^-6-(^-1)={}^-5$	$^-6+1={}^-5$
$5+(^-2)=3$	$5-2=3$	$^-2+4=2$	$3-5={}^-2$	$^-6-(^-2)={}^-4$	$^-6+2={}^-4$
$5+(^-3)=2$	$5-3=2$	$^-3+4=1$	$2-5={}^-3$	$^-6-(^-3)={}^-3$	$^-6+3={}^-3$
$5+(^-4)=1$	$5-4=1$	$^-4+4=0$	$1-5={}^-4$	$^-6-(^-4)={}^-2$	$^-6+4={}^-2$
$5+(^-5)=0$	$5-5=0$	$^-5+4={}^-1$	$0-5={}^-5$	$^-6-(^-5)={}^-1$	$^-6+5={}^-1$
$5+(^-6)={}^-1$	$5-6={}^-1$	$^-6+4={}^-2$	$^-1-5={}^-6$	$^-6-(^-6)=0$	$^-6+6=0$
$5+(^-7)={}^-2$	$5-7={}^-2$	$^-7+4={}^-3$	$^-2-5={}^-7$	$^-6-(^-7)=1$	$^-6+7=1$
$5+(^-8)={}^-3$	$5-8={}^-3$	$^-8+4={}^-4$	$^-3-5={}^-8$	$^-6-(^-8)=2$	$^-6+8=2$
$5+(^-9)={}^-4$	$5-9={}^-4$	$^-9+4={}^-5$	$^-4-5={}^-9$	$^-6-(^-9)=3$	$^-6+9=3$

$4+(^-9)={}^-5$	$4-9={}^-5$	$-5-(^-9)=4$	$-5+9=\ 4$
$3+(^-9)={}^-6$	$3-9={}^-6$	$-4-(^-9)=5$	$-4+9=\ 5$
$2+(^-9)={}^-7$	$2-9={}^-7$	$-3-(^-9)=6$	$-3+9=\ 6$
$1+(^-9)={}^-8$	$1-9={}^-8$	$-2-(^-9)=7$	$-2+9=\ 7$
$0+(^-9)={}^-9$	$0-9={}^-9$	$-1-(^-9)=8$	$-1+9=\ 8$
$-1+(^-9)={}^-10$	$-1-9={}^-10$	$0-(^-9)=9$	$0+9=\ 9$
$-2+(^-9)={}^-11$	$-2-9={}^-11$	$1-(^-9)=10$	$1+9=\ 10$
$-3+(^-9)={}^-12$	$-3-9={}^-12$	$2-(^-9)=11$	$2+9=\ 11$
$-4+(^-9)={}^-13$	$-4-9={}^-13$	$3-(^-9)=12$	$3+9=\ 12$

When adding numbers with the same sign, add their absolute values and give the answer the same sign as the original numbers.

When adding numbers with different signs, subtract their absolute values and give the answer the sign of the number with the larger absolute value.

By definition, Subtraction of a number is the same as adding the opposite of that number.

$$a+(^-b)=a-b \qquad \text{EX: } 4+(^-11)=4-11$$

The opposite of a negative number is a positive number: $\qquad -(^-c)=c \qquad$ EX: $-(^-8)=8$

The sum of a number and its opposite equals zero: $\qquad a+(^-a)=0 \qquad$ EX: $10+(^-10)=0$

$a \ \ and \ -a$ are called additive inverses (also called opposites)

Two angles whose measures add up to 90° are Complementary Angles
 Exterior sides of two adjacent complementary angles form a Right Angle.

Two angles whose measures add up to 180° are Supplementary Angles
 Exterior sides of two adjacent supplementary angles form a Straight Line.

$$(5)(4) = 20$$
$$(5)(3) = 15$$
$$(5)(2) = 10$$
$$(5)(1) = 5$$
$$(5)(0) = 0$$
$$(5)(-1) = -5$$
$$(5)(-2) = -10$$
$$(5)(-3) = -15$$
$$(5)(-4) = -20$$

$$\left\{ \begin{array}{l} (-10)+(-10)+(-10)+(-10) \\ -10 - 10 - 10 - 10 \end{array} \right\} = -40 \quad = (4)(-10) = (-10)(4)$$

$$\left\{ \begin{array}{l} (-10)+(-10)+(-10) \\ -10 - 10 - 10 \end{array} \right\} = -30 \quad = (3)(-10) = (-10)(3)$$

$$\left\{ \begin{array}{l} (-10)+(-10) \\ -10 - 10 \end{array} \right\} = -20 \quad = (2)(-10) = (-10)(2)$$

$$(4)(-6) = -24$$
$$(3)(-6) = -18$$
$$(2)(-6) = -12$$
$$(1)(-6) = -6$$
$$(0)(-6) = 0$$
$$(-1)(-6) = 6$$
$$(-2)(-6) = 12$$
$$(-3)(-6) = 18$$
$$(-4)(-6) = 24$$

Quotient of Two Real Numbers: If a and b are real numbers, $b \neq 0$, then $a \div b = \dfrac{a}{b} = a \cdot \dfrac{1}{b}$

Rules for Multiplying or Dividing Real Numbers:
1. The product or quotient of two numbers with the **same sign** will have a result that is **positive**.
2. The product or quotient of two numbers with **different signs** will have a result that is **negative**.

$$(a)(-b) = (-a)(b) = -(ab) \qquad \left(^-5\right)(3) = (5)\left(^-3\right) = {}^-15$$

$$\frac{-a}{b} = \frac{a}{-b} = -\frac{a}{b} \qquad \frac{^-8}{2} = \frac{8}{^-2} = {}^-4$$

$$(-a)(-b) = ab \qquad \left(^-8\right)\left(^-6\right) = (8)(6) = 48$$

$$\frac{-a}{-b} = \frac{a}{b} \qquad \frac{^-30}{^-5} = \frac{30}{5} = 6$$

Reciprocals or Multiplicative Inverses:
Two numbers whose product equals 1 are reciprocals or multiplicative inverses of each other. The reciprocal of $\dfrac{a}{b}$ is $\dfrac{b}{a}$, $a \neq 0$ and $b \neq 0$.

$Reciprocal\ of\ \dfrac{2}{5}\ is\ \dfrac{5}{2}$

$Reciprocal\ of\ -\dfrac{10}{3}\ is\ -\dfrac{3}{10}$

$Reciprocal\ of\ 4\dfrac{2}{9}\ is\ \dfrac{9}{38}$

$Note:\ 4\dfrac{2}{9} = \dfrac{38}{9}$

$Reciprocal\ of\ -3.5\ is\ \dfrac{1}{-3.5} = \dfrac{10}{-35} = -\dfrac{2}{7}$

$Note:\ -3.5 = -\dfrac{7}{2}$

$Reciprocal\ of\ 0.01\ is\ \dfrac{1}{0.01} = \dfrac{100}{1} = 100$

$Note:\ 0.01 = \dfrac{1}{100}$

Zero as a Divisor or Dividend: $a \neq 0$ and $b \neq 0$

1. $\dfrac{a}{0}$ is undefined.

2. $\dfrac{0}{b} = 0$.

3. $\dfrac{0}{0}$ is indeterminant.

Evaluate

$^-16+25$ $\qquad$ $^-12+\left(^-20\right)$ $\qquad$ $^-9-\left(^-10\right)$ $\qquad$ $6-11$

$14+\left(^-2\right)$ $\qquad$ $^-19-\left(^-11\right)$ $\qquad$ $8+\left(^-13\right)$ $\qquad$ $^-21-15$

$8-\left(^-13\right)$ $\qquad$ $^-21+15$ $\qquad$ $30+\left(^-13\right)$ $\qquad$ $^-20-33$

$14+\left(^-25\right)$ $\qquad$ $^-32+28$ $\qquad$ $22-\left(^-43\right)$ $\qquad$ $^-29+\left(^-11\right)$

$^-45+80$ $\qquad$ $^-53-\left(^-23\right)$ $\qquad$ $31-46$ $\qquad$ $^-27-\left(^-70\right)$

$^-5\cdot8$ $\qquad$ $6\left(^-2\right)$ $\qquad$ $\left(^-9\right)\left(^-4\right)$ $\qquad$ $(8)\left(^-3\right)$

$\left(^-9\right)\left(^-4\right)$ $\qquad$ $\left(^-11\right)(5)$ $\qquad$ $(2)(6)\left(^-3\right)$ $\qquad$ $\left(^-9\right)(5)\left(^-1\right)$

$(4)\left(^-2\right)\left(^-2\right)$ $\qquad$ $\left(^-5\right)\left(^-3\right)\left(^-10\right)$ $\qquad$ $\left(^-3\right)\left(^-2\right)(5)$ $\qquad$ $\left(^-1\right)(7)(5)$

$\left(^-2\right)\left(^-2\right)\left(^-5\right)\left(^-10\right)$ $\qquad$ $(4)\left(^-3\right)\left(^-1\right)\left(^-6\right)$ $\qquad$ $\left(^-5\right)\left(^-2\right)\left(^-3\right)\left(^-3\right)\left(^-2\right)$ $\qquad$ $\left(^-2\right)\left(^-2\right)\left(^-3\right)\left(^-1\right)\left(^-2\right)\left(^-2\right)$

$(6)\div\left(^-3\right)$ $\qquad$ $\left(^-12\right)\div\left(^-6\right)$ $\qquad$ $\left(^-45\right)\div(9)$ $\qquad$ $\left(^-10\right)\div(5)\left(^-2\right)$

$\left(^-4\right)\left(^-6\right)\div\left(^-8\right)$ $\qquad$ $(48)\div\left(^-4\right)\div(2)$ $\qquad$ $\left(^-27\right)\div\left(^-3\right)(3)$ $\qquad$ $\left(^-80\right)\div\left(^-4\right)\div\left(^-2\right)$