Last one...

$$\sqrt{6x+7}-\sqrt{3x+3}=1$$

$$\left(\sqrt{6x+7}\right)^2=\left(1+\sqrt{3x+3}\right)^2$$

$$6x+7=1+2\sqrt{3x+3}+3x+3$$

$$6x+7-1-3x-3=2\sqrt{3x+3}$$

$$(3x+3)^2=\left(2\sqrt{3x+3}\right)^2$$

$$9x^2+18x+9=4(3x+3)$$

$$9x^2+18x+9=12x+12$$

$$9x^2+6x-3=0 \quad \text{(Hard Trinomial)}$$

$$9x^2+9x-3x-3=0$$

$$9x(x+1)-3(x+1)=0$$

$$(x+1)(9x-3)=0$$

OR ...

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

$x+1=0$ OR $9x-3=0$

$x=-1$

$9x=3$

$x=\frac{1}{3}$

Verify:

$$\sqrt{6x+7}-\sqrt{3x+3}=1$$

$x=-1$

LS: $\sqrt{1}-\sqrt{0}$

1

RS: 1

$x=\frac{1}{3}$

LS: $\sqrt{9}-\sqrt{4}$

$3-2$

1

RS: 1

Practice Problems: Pages 300 - 303
4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 18, 21

Bonus Problem...

$$\sqrt{2x+5} - \sqrt{x-1} = \sqrt{x+2}$$

Absolute Value

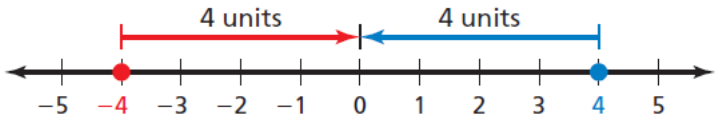
$|4| = 4$

$|-4| = 4$

Key Idea

Absolute Value

Words The **absolute value** of an integer is the distance between the number and 0 on a number line. The absolute value of a number a is written as $|a|$.



Numbers $|-4| = 4$ $|4| = 4$

Let's Practice

i. $|-12| = 12$

ii. $|0| = 0$

iii. $|3 - \pi| = \pi - 3$

A few more just to be sure...

$|-3 - 5|$

$|-8|$

$= 8$

$|-3 + 5|$

$|2|$

$= 2$

$-2 - |-3|$

$-2 - (3)$

$= -5$

$|-1| + |-4|$

$1 + 4$

$= 5$

$|(-1) + (-4)|$

$|-5| = 5$

$|-10| - |-7|$

$10 - 7$

$= 3$

Southern Alberta often experiences dry chinook winds in winter and spring that can change temperatures by a large amount in a short time. On a particular day in Warner, Alberta, the temperature was −11 °C in the morning. A chinook wind raised the temperature to +7 °C by afternoon. The temperature dropped to −9 °C during the night. Use absolute value symbols to write an expression for the total change in temperature that day. What is the total change in temperature for the day?

$22-(-19)$
$=41$

Did You Know?

In 1962 in Pincher Creek, Alberta, a chinook raised the temperature by 41 °C (from −19 °C to +22 °C) in 1 h. This is a Canadian record for temperature change in a day.

$|-19-22|=41$

Total change $= |+11-7| + |7+9|$

$= 18+16$

$= 34°C$

Here is a more Mathematical definition...

I ABSOLUTE VALUE

$-\left(-\frac{4}{7}\right) = \frac{4}{7}$

Between Bars Positive

E.1 DEFINITION. The ***absolute value*** or ***magnitude*** of a real number a is denoted by $|a|$ and is defined by

$$|a| = \begin{cases} a & \text{if} \quad a \geq 0 \\ -a & \text{if} \quad a < 0 \end{cases}$$

← piecewise function

BBN

▶ Example 1

$$|5| = 5 \qquad \left|-\tfrac{4}{7}\right| = -\left(-\tfrac{4}{7}\right) = \tfrac{4}{7} \qquad |0| = 0 \ \blacktriangleleft$$

Since $5 > 0$ | Since $-\frac{4}{7} < 0$ | Since $0 \geq 0$

Note that the effect of taking the absolute value of a number is to strip away the minus sign if the number is negative and to leave the number unchanged if it is nonnegative.

Expressing without absolute value symbol...

Example:

$|x+3| \longrightarrow$

$\begin{cases} x+3 & , \text{if } x+3 \geq 0 \\ -(x+3) & , \text{if } x+3 < 0 \end{cases}$

BBP

BBN

$\longrightarrow \begin{cases} x+3, & \text{if } x \geq -3 \\ -(x+3), & \text{if } x < -3 \end{cases}$

$|x-5| \longrightarrow$