COLLEGE ALGEBRA

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GPS # 23 **2.8 ADDITIONAL EQUATIONS AND INEQUALITIES**

Class Time: T/Th 11:30 Date: 2-21-08

Useful Guidelines:

* To solve absolute value equations and inequalities:

1) $|ax+b|=k$: solve the compound equation $ax+b=k$ or $ax+b=-k$

2) $|ax+b|>k$: solve the compound inequality $ax+b>k$ or $ax+b<-k$ region

3) $|ax+b|<k$: solve the compound inequality $-k<ax+b<k$

$-$ = right

$+$ = left

$>$ $<$ = ( ) $\leq$ $\geq$ = [

20/20

Solve the following absolute value equations and inequalities. Give the solution set in set notation for equations and in interval notation for inequalities. Graph the solution set.

1. a) $|4x+2|=18$

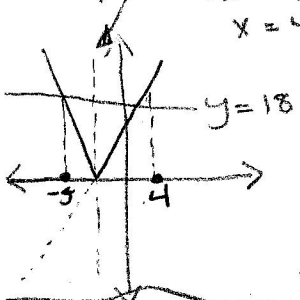
$4x+2=18$ or $4x+2=-18$

$-2 \quad -2 \qquad -2 \quad -2$

$4x=16 \qquad 4x=-20$

$x=4$ or $x=-5$

$x+2=0$, $-2 \quad -2$, $\frac{4x}{4}=\frac{2}{4}$, $x=-\frac{1}{2}$



Sol set: $\{x \mid x=-5 \text{ or } x=4\}$

b) $|3x+3|+6=15$

$-6 \quad -6$

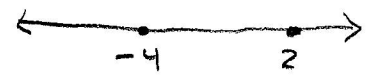
$|3x+3|=9$

$3x+3=9$ or $3x+3=-9$

$-3 \quad -3 \qquad -3 \quad -3$

$\frac{3x}{3}=\frac{6}{3} \qquad \frac{3x}{3}=\frac{-12}{3}$

$x=2 \qquad x=-4$



solution set: $\{x \mid x=-4 \text{ or } x=2\}$

2. a) $|x+1|>6$

$x+1>6$ or $x+1<-6$

$-1 \quad -1 \qquad -1 \quad -1$

$x>5$ or $x<-7$

Solution set: $\{x \mid x>5 \text{ or } x<-7\}$

Interval notation: $(-\infty,-7)\cup(5,\infty)$

b) $|3-y|+3\geq 6$

$-3 \quad -3$

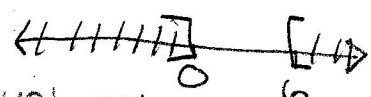
$|3-y|\geq 3$

$3-y\geq 3$ or $3-y\leq -3$

$-3 \quad -3 \qquad -3 \quad -3$

$\frac{-y}{-1}\geq\frac{0}{-1} \qquad \frac{-y}{-1}\leq\frac{-6}{-1}$

$y\leq 0 \qquad y\geq 6$



Interval notation: $(-\infty,0]\cup[6,\infty)$

Solution set: $\{y \mid y\leq 0 \text{ or } y\geq 6\}$

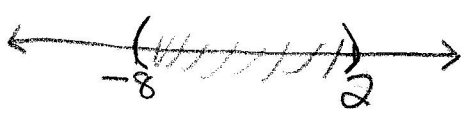
3. a) $|2x+6|<10$

$2x+6<10$ and $2x+6>-10$

$-6 \quad -6 \qquad -6 \quad -6$

$\frac{2x}{2}<\frac{4}{2} \qquad \frac{2x}{2}>\frac{-16}{2}$

$x<2$ and $x>-8$



Solution set: $\{x \mid x<2 \text{ and } x>-8\}$

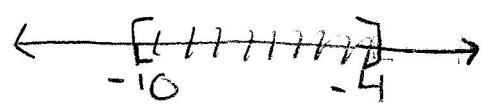
Interval notation: $(-8,2)$

b) $|x+7|\leq 3$

$x+7\leq 3$ and $x+7\geq -3$

$-7 \quad -7 \qquad -7 \quad -7$

$x\leq -4 \qquad x\geq -10$



Solution set: $\{x \mid x\leq -4 \text{ and } x\geq 10\}$

Interval notation: $(-10,-4)$