8/30/2012 Sec 2.7 Math 1010

2.5 40

$$10\left(\frac{1}{5}x+2\right) < 10\left(\frac{1}{5}x+1\right)$$

$\frac{10}{5}$

$$2x + 20 < 2x + 10$$

$-2x \quad -2x$

$20 < 10$ ← false

#35

$\frac{6}{4} = \frac{3}{2}$

$$-\frac{1}{4}(p+6) + \frac{3}{2}(2p-5) < 10$$

$$-\frac{1}{4}p + -\frac{3}{2} + 3p + -\frac{15}{2} < 10$$

$2\frac{3}{4}$ $\frac{18}{2}$

d/c

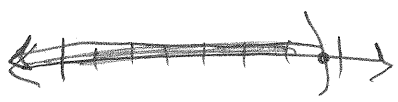
$$\frac{11}{4}p + -9 < 10$$

$+9 \quad +9$

$$\frac{\frac{11}{4}p}{11/4} < \frac{19}{11/4}$$

$$p < 19 \cdot \frac{4}{11}$$

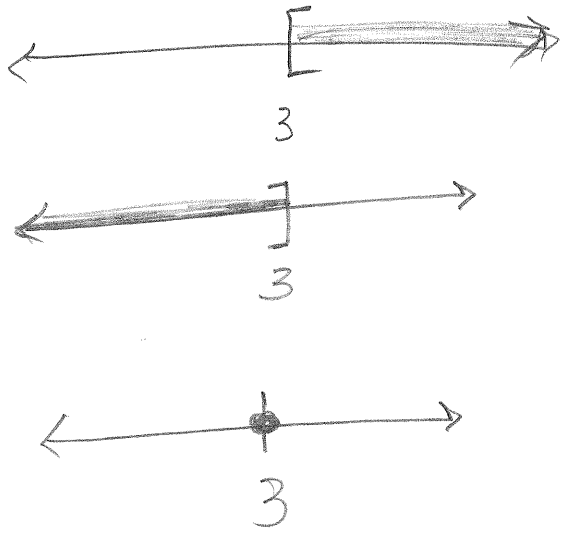
$$p < \frac{76}{11}$$



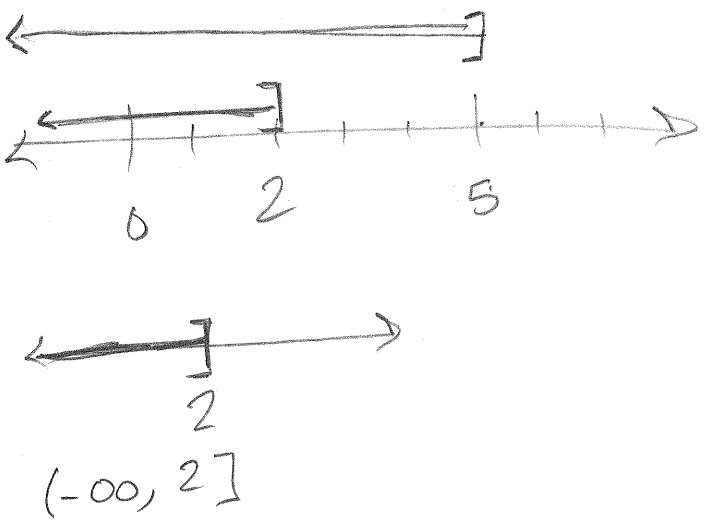
$(-\infty, \frac{76}{11})$

2.6

#18



#21 $x \leq 2$ and $x \leq 5$



$(-\infty, 2]$

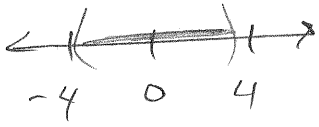
Sec 2.7 Absolute Values Equations and Inequalities

The <u>Absolute Value</u> of a Number is the distance from that number to Zero

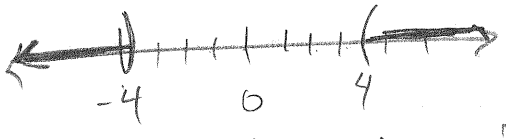
$|x|$ ← written

$|-2| = 2 \quad |-4| = 4 \quad |4| = 4$

$|x| = 3 \Rightarrow x = 3, x = -3$

$|x| < 4$  ← and

$-4 < x < 4 \quad , (-4, 4)$

$|x| > 4$  ← or

$(-\infty, -4) \cup (4, \infty)$

Solving Equations and Inequalities with Absolute Values

1st Get the Absolute value alone on one side of the equation/inequality (preferably on the left)

2nd Remove the absolute value by using the correct case

Case 1: $|ax+b| = k$ become (equal)

$ax+b = k$ or $ax+b = -k$

Case 2: $|ax+b| > k$ become (greater than) — switched

$ax+b > k$ or $ax+b < -k$

Case 3: $|ax+b| \leq k$ becomes (less than) — switched

$ax+b \leq k$ and $ax+b \geq -k$

$-k \leq ax+b \leq k$

3rd Solve

4th Check

Example #4

$$|x+3|+5=12$$
$$-5 \quad -5$$
$$|x+3|=7$$

Check
$x=4$
$|4+3|+5=12$
$|7|+5=12$
$7+5=12$ ✓

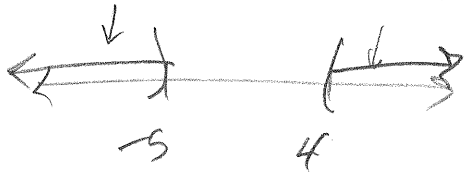
Check
$x=-10$
$|-10+3|+5=12$
$|-7|+5=12$
$7+5=12$ ✓

$$x+3=7 \quad \text{or} \quad x+3=-7$$
$$-3 \quad -3 \qquad -3 \quad -3$$
$$x=4 \qquad x=-10$$

$\{-10, 4\}$, $\boxed{x=-10, 4}$

Ex: $|2x+1| \geq 9$

$$2x+1 \geq 9 \quad \boxed{\text{or}} \quad 2x+1 \leq -9$$
$$-1 \quad -1 \qquad -1 \quad -1$$
$$\frac{2x}{2} \geq \frac{8}{2} \qquad \frac{2x}{2} \leq \frac{-10}{2}$$
$$x \geq 4 \qquad x \leq -5$$



$(-\infty, -5) \cup (4, \infty)$

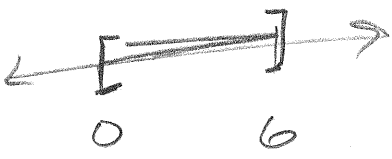
#56 $|2x-6| \leq 6$

$-6 \leq 2x-6 \leq 6$

$+6 \quad +6 \quad +6$

$\frac{0}{2} \leq \frac{2x}{2} \leq \frac{12}{2}$

$0 \leq x \leq 6$



$[0, 6]$

$2x-6 \leq 6$ and $2x-6 \geq -6$

$+6 \quad +6$

$2x \leq 12$

$x \leq 6$ and $x \geq 0$

$|ax+b| = |cx+d|$

$ax+b = cx+d$ or $ax+b = -(cx+d)$

#83 $|6x| = |9x+1|$

$6x = 9x+1$ or $6x = -(9x+1)$

$|5x-3| = -4$ ← Not possible ∅

~~$5x-3=-4$ or $5x-3=4$~~

Look for an absolute value being negative

$|3x+2| > -5$ ← $(-\infty, \infty)$

$|3x+2| < -5$ ← ∅

$|x-7| + 4 = 4$

$-4 \quad -4$

$|x-7| = 0$