Algebra I Part II Section 7.6 Name_____

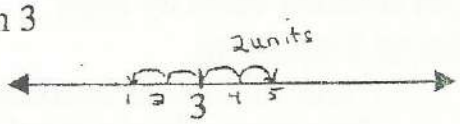
Absolute Value Equations

Absolute Value as a Distance:

$|x-3|$ means the distance from 3

$|x-3| = 2$

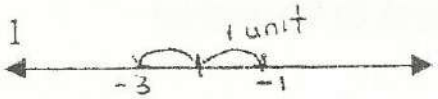
↑ start here ↖ 2 units



Answer: $x = 1$ or $x = 5$

$|x+2| = 1$ means $|x-(-2)| = 1$

↑ one unit ↑ start here



Answer: $x = -3$ or $x = -1$

Draw the number line and solve the absolute value equation:

1. $|x-3| = 4$

Answer:_____

2. $|x-1| = 2$

Answer:_____

3. $|x-6| = 2$

Answer:_____

4. $|x+5| = 1$

Answer:_____

5. $|x+3| = 3$

Answer:_____

6. $|x+2| = 4$

Answer:_____

Solve Algebraically:

1. Get absolute value by itself
2. Set up 2 equations
   *one without the absolute values
   *the other without absolute values and change the sign of the right side.
3. Check in the original

Example 1:

$|x-3|=4$

$x-3=4$ or $x-3=-4$

$+3\quad+3$ $+3\quad+3$

$x=7$ $x=-1$

Check: $|x-3|=4$ $|7-3|=4$ $|4|=4\checkmark$ $|x-3|=4$ $|-1-3|=4$ $|-4|=4\checkmark$

Answer: $x=7$ or $x=-1$

Example 2:

$|x+2|=5$

$x+2=5$ or $x+2=-5$

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

$x=3$ $x=-7$

Check: $|x+2|=5$ $|3+2|=5$ $|5|=5\checkmark$ $|x+2|=5$ $|-7+2|=5$ $|-5|=5\checkmark$

Answer: $x=3$ or $x=-7$

Try:

1. $|x-1|=2$

2. $|x+5|=1$

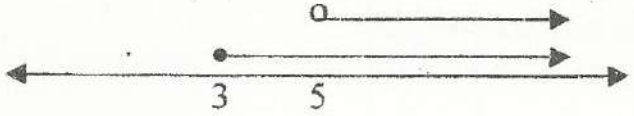
3. $|3x-1|=2$

4. $|-2x+5|=1$

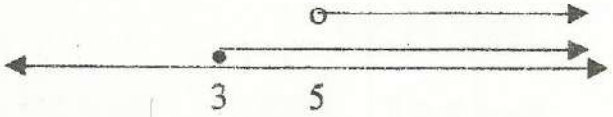
Algebra I Part II Worksheet 7.4 Name_____
Mrs. Ratliff

Find the solution:
AND – WHERE THERE IS 2 LINES (INTERSECTION)
OR – AT LEAST ONE LINE (UNION)

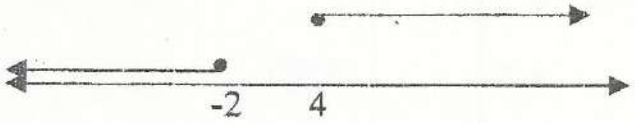
1. AND Answer:_____



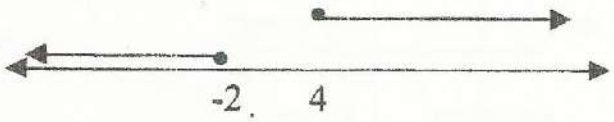
2. OR Answer:_____



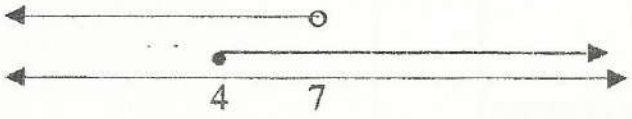
3. AND Answer:_____



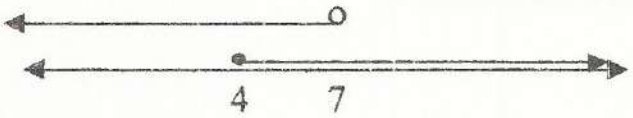
4. OR Answer:_____



5. AND Answer:_____



6. OR Answer:_____



Algebra I Part II Section 7.6 cont... Name_____
Absolute Value Inequalities

$|x| > \#$ means OR
$|x| < \#$ means AND

1. Get the Asbolute Value by itself
2. Make TWO inequalities with the correct word OR/AND
   *first inequality – just take off the absolute value
   *second inequality – take off the absolute value, flip $<>$ symbol, and change signs on the right side

Example:

$|2x + 3| > 5$

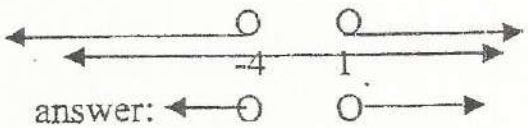
$2x + 3 > 5$ OR $2x + 3 < -5$

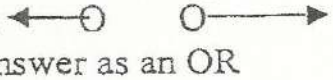
$-3 \quad 3 \qquad -3 \quad -3$

$\frac{2x}{2} > \frac{2}{2} \qquad \frac{2x}{2} < \frac{-8}{2}$

$x > 1$ OR $x < -4$

OR means 1 or more lines



answer: 

Write answer as an OR
$X < -4$ OR $x > 1$

Example

$|2x + 3| < 5$

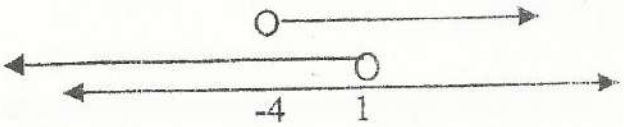
$2x + 3 < 5$ AND $2x + 3 > -5$

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

$\frac{2x}{2} < \frac{2}{2} \qquad \frac{2x}{2} > \frac{-8}{2}$

$x < 1$ AND $x > -4$

AND means 2 lines



answer: 

Write answer as a between
$-4 < x < 1$

Be careful to watch the following:

$\|x\| =$ NEGATIVE	NO SOLUTION
$\|x\| <$ NEGATIVE	NO SOLUTION
$\|x\| >$ NEGATIVE	INFINITE SOLUTIONS