

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Hour: \_\_\_\_\_

## Guided Notes - Absolute Value Inequalities

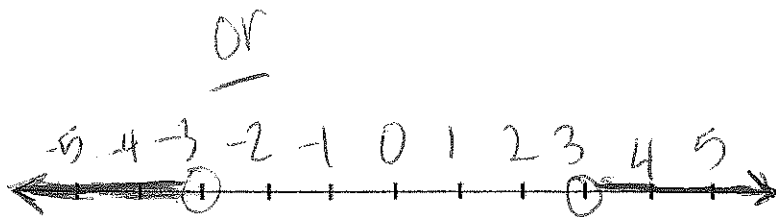
Definition of absolute value: distance a number is from zero.

We can use this definition to help us solve inequalities involving absolute value.

Say we have the following inequality...

$$|x| > 3$$

OR  
this means that the distance between  $x$  and zero is more than 3 units.



Say we have the following inequality instead...

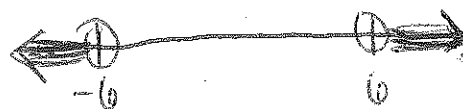
$$|x| < 3$$

and  
this means that the distance between  $x$  and zero is less than 3 units.



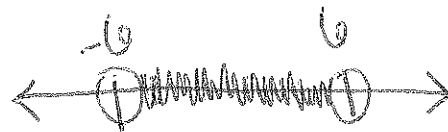
If the absolute value is greater than (or equal to) a number, then it becomes an OR compound inequality.

Example:  $|p| > 6$  - "or"  
 $p > 6$  or  $p < -6$



If the absolute value is less than (or equal to) a number, then it becomes an and compound inequality.

Example:  $|p| < 6$  - "and"  
 $-6 < p$  and  $p < 6$   
 $-6 < p < 6$



Solve the following inequalities on your own. Graph the solution set on a number line.

1.  $|c| \geq 8$  - or

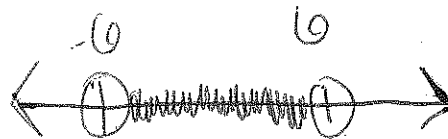
$$c \geq 8 \text{ or } c \leq -8$$



2.  $|z| < 6$  - and

$$z > -6 \text{ and } z < 6$$

$$-6 < z < 6$$

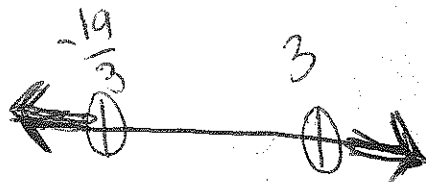


3.  $|3x + 5| > 14$  - or

$$3x + 5 > 14 \text{ or } 3x + 5 < -14$$

$$3x > 9 \text{ or } 3x < -19$$

$$x > 3 \text{ or } x < -19/3$$

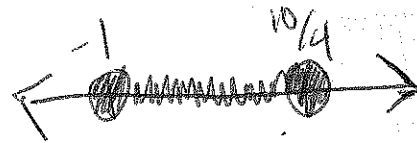


4.  $|4y - 3| \leq 7$  → and

$$4y - 3 \leq 7 \text{ and } 4y - 3 \geq -7$$

$$4y \leq 10 \text{ and } 4y \geq -4$$

$$y \leq 10/4 \text{ and } y \geq -1$$



5.  $|-4k| > 16$

or

$$\frac{-4k}{-4} > \frac{16}{-4} \text{ or } \frac{-4k}{-4} < \frac{-16}{-4}$$

$$k < -4 \text{ or } k > 4$$



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### Compound Inequalities

Solve the following inequalities. Graph the solution set on a number line.

1.  $8 < 3y - 7 < 23$

2.  $4r + 3 < -6$  OR  $3r - 7 > 2$

3.  $8 < 2v - 4$  AND  $2v - 4 < 16$

4.  $6y - 3 < -27$  OR  $-4y + 2 < -26$

5. Khalid is considering several types of paint for his bedroom. He estimates that he will need between 2 and 3 gallons. The table below shows the price per gallon for each type of paint Khalid is considering. Write a compound inequality and determine how much he could be spending.

Paint Type	Price per Gallon
Flat	\$21.98
Satin	\$23.98
Semi-Gloss	\$24.98
Gloss	\$25.98

6. The airline on which Lena is flying has weight restrictions for checked baggage. Lena is checking one bag.

Cost for Checked Baggage	
Weight	Cost
Up to 50 lb limit	free
20 lb over limit	\$25
More than 20, but less than 50 lb over limit	\$50
More than 50 lb over limit	Not accepted

- Describe the ranges of weights that would classify Lena's bag as free, \$25, \$50, and unacceptable.
- If Lena's bag weighs 68 pounds, how much will she pay to take it on the plane?

Solve each inequality. Graph the solution on a number line.

7.  $n + 6 > 2n + 5 > n - 2$

8.  $y + 7 < 2y + 2 < 0$

9.  $2x + 6 < 3(x - 1) \leq 2(x + 3)$

10.  $a - 16 \leq 2(a - 4) < a + 2$

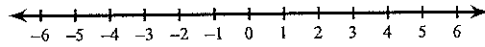
11.  $4g + 8 \geq g + 6$  or  $7g - 14 \geq 2g - 4$

12.  $5t + 7 > 2t + 4$  and  $3t + 3 < 24 - 4t$

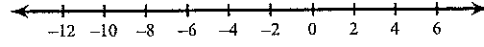
## Absolute Value Inequalities

Solve each inequality and graph its solution.

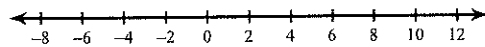
1)  $|6n| \leq 18$



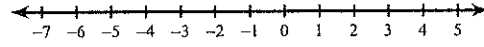
2)  $|p + 4| \leq 8$



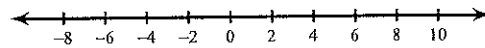
3)  $|m - 2| < 8$



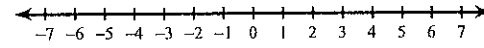
4)  $|5x| \leq 10$



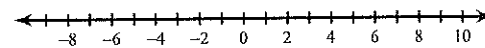
5)  $|x| + 5 \geq 11$



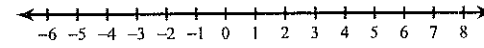
6)  $|m| - 2 > 0$



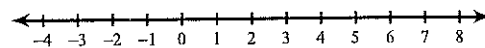
7)  $|r| - 3 > 2$



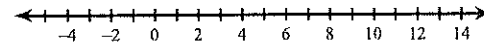
8)  $|n| + 2 \geq 5$



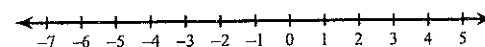
9)  $|x - 2| - 5 < -2$



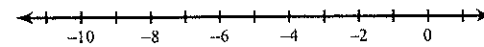
10)  $|x - 4| - 3 < 5$



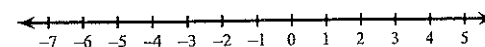
11)  $1 + |1 + b| < 4$



12)  $|v + 5| - 6 < -5$



13)  $|10p - 4| < 34$



14)  $|6 + 9x| \leq 24$

