Name: _____ Date: _____

Notes: Solving Absolute Value Equations and Inequalities

Do Now: Find **ALL** possible values of x in each equation.

1) $|x| = 7$

2) $|x| + 2 = 7$

3) $|x - 2| = 7$

4) $|x| + 10 = 7$

5) $2|x| = 7$

What Should I Be Able to Do?

- I can solve absolute value equations with variables on one side or both sides of the equation.

- I can explain the rationale behind the process of solving an absolute value equation.

- I can assess whether an absolute value equation has no solutions.

- I can solve absolute value inequalities.

- I can explain the rationale behind the process of solving an absolute value inequality.

- I can assess when an absolute value inequality has no solutions or has a solution set of all real numbers.

Solve each of the following equations:

1) $|3x - 1| = 28$

2) $-6|x - 15| - 10 = 2$

Vocab Corner

Extraneous Solution: A solution to a transformed version of an equation that is not a true solution to the original equation.

3) $|x - 2| = -3x + 18$

Checkpoint:

Solve each of the following equations:

1) $-5|2x+3|+1=-24$

2) $3|x-15|+9=8$

3) $6x-22=|x+4|-8$

4) The equation $|3x-2|-1=17$ has 2 unique solutions that can be found using which two equations?

A. $3x-3=17$ and $-3x-3=-18$

B. $3x-2=16$ and $3x-2=18$

C. $3x-2=16$ and $-(3x-2)=16$

D. $3x-2=18$ and $-(3x-2)=18$

E. $3x-2=18$ and $-(3x-2)=16$

Solve the following inequalities:

1) $|x| > 7$

2) $|x - 6| \leq 7$

What makes the process of solving an absolute value *inequality* different from solving an absolute value *equation*?

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Solve the following inequalities:

1) $|x-6|+3>7$

2) $3|2x-5|-6\leq 15$

3) $|x-1|>-6$

4) $|x-1|<-6$

Success Criteria

- I can solve absolute value equations with variables on one side or both sides of the equation.

Solve each of the following equations.

1) $|-2x + 8| - 7 = 23$

2) $|x - 3| + 9 = 3x - 10$

- I can explain the rationale behind the process of solving an absolute value equation.

- I can assess whether an absolute value equation has no solutions.

Explain when an absolute value equation has no solutions. Then, give an example of an absolute value equation that has no solutions.

- I can solve absolute value inequalities.

Solve each of the following inequalities.

1) $|5x + 27| - 12 \leq 10$

2) $-2|x - 12| - 6 < 8$

- I can explain the rationale behind the process of solving an absolute value inequality.

- I can assess when an absolute value inequality has no solutions or has a solution set of all real numbers.

Explain when an absolute value inequality has no solutions. Then, give an example of an absolute value inequality that has no solutions.

Explain when an absolute value inequality has a solution set of all real numbers. Then, give an example of an absolute value inequality that has a solution set of all real numbers.

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Classwork: Solving Absolute Value Equations and Inequalities

Solve each of the following equations and inequalities.

1) $\left|\frac{3x-9}{7}\right| = 10$

2) $4|5x| - 8 \leq 9$

3) $\left|\frac{7}{13}x - 4\right| + 20 \geq 15$

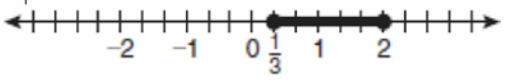
4) $\left|\frac{4}{5}x - 18\right| + 12 = 18$

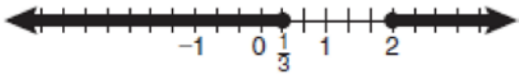
5) $-2|x + 1| + 9 = 4x - 7$

6) $-2|6x - 16| + 54 > -18$

7) The inequality $|3.75F - 24| \leq 70$ represents the range of monthly average temperatures, F, in degrees Fahrenheit, for Fairbanks, Alaska. Solve for F.

8)
Which graph represents the solution set of $|6x - 7| \leq 5$?

1)


2)


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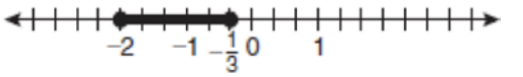
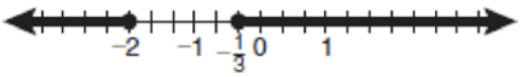
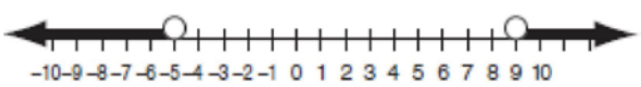


4)


9)
The solution set of which inequality is represented by the accompanying graph?



1) $|x - 2| > 7$
2) $|x - 2| < 7$
3) $|2 - x| > -7$
4) $|2 - x| < -7$