

3.1 Absolute Value Inequalities

NOTES

Write your questions here!

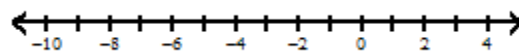
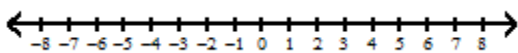


$$2x + 1 = 9$$

$$2|x + 5| + 1 = 9$$

$$2x + 1 \leq 9$$

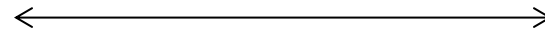
$$2|x + 5| + 1 \leq 9$$



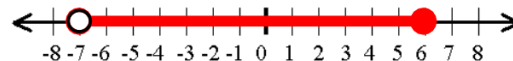
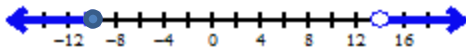
Compound Inequalities

$$\frac{|x - 3|}{2} < 4$$

$$4 - 3|x + 1| \leq -17$$



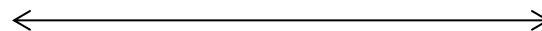
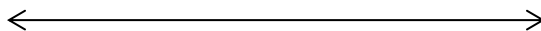
Write the compound inequality



Solve each inequality and graph its solution

$$\frac{2}{3}|-5 + y| \geq 2$$

$$4 + 2|9.3 - 5m| < 68.8$$



Special Cases

SUMMARY:

Now,
summarize
your notes
here!

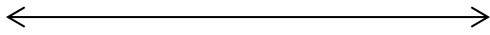


3.1 Absolute Value Inequalities

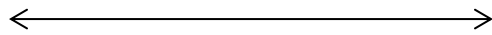
PRACTICE

Graph the following compound inequalities.

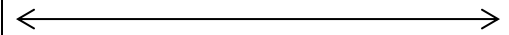
1. $x \geq 4$ or $x < -5$



2. $y > -2.5$ and $y \leq 3.2$

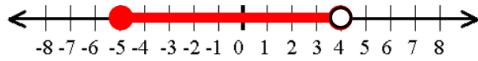


3. $\frac{1}{2} \leq x < 4$

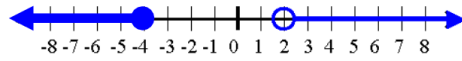


Write a compound inequality that represents the following.

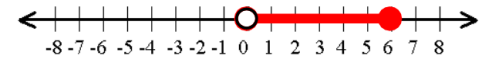
4.



5.

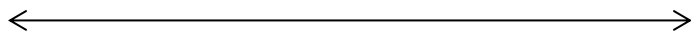


6.

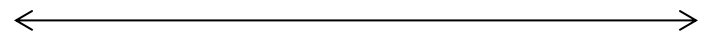


Solve each inequality and graph its solution.

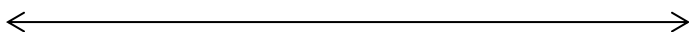
7. $|3w - 15| < 30$



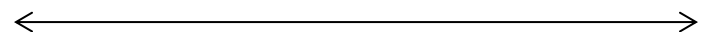
8. $\left| \frac{2}{5}n - 8 \right| + 4 \geq 12$



9. $\frac{|2h-1|}{3} < -4$

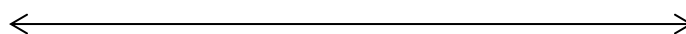
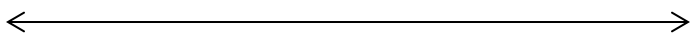


10. $2|2 - 5n| + 4.2 \geq 18.6$



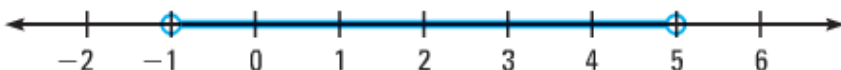
11. $|2g - 5| - 3 \geq 7$

12. $-\frac{2}{3}|4x - 3| < -6$



Multiple Choice

13. Which absolute value inequality represents the graph shown below?



- (A) $-1 < |x| < 5$ (B) $|x + 2| < 3$ (C) $|x - 2| < 3$ (D) $|x - 2| < 5$

Error Analysis

14. Describe and correct the error in solving the inequality.

$$|6 - 3x| > 27$$

$$6 - 3x > 27 \text{ OR } 6 - 3x < -27$$

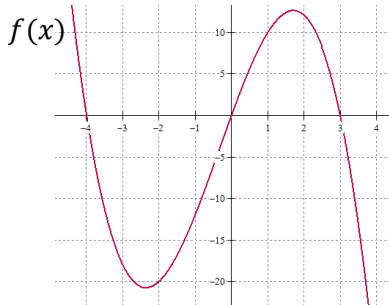
$$-3x > 21 \qquad -3x < -33$$

$$x > -7 \qquad x < 11$$

X

ALGEBRA SKILLZ!

GRAPH



- a. $f(1) =$
 b. y-intercept =
 c. $f(x) = -15$ when $x =$
 d. x-intercept(s) =

SIMPLIFY

Simplify the radical

- a. $\sqrt{28}$

 b. $2\sqrt{18}$

SOLVE

Solve for x.

a. $\frac{21}{x} + 2 = 9$

FACTOR

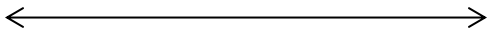
b. $x^2 - 6x - 27$

3.1 Absolute Value Inequalities

APPLICATION

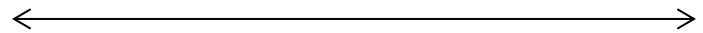
1. Graph the compound inequality.

$$-7.25 \leq x < 5$$



2. Solve the inequality and graph its solution.

$$4|2x + 5| \geq 80$$



3. **RANGE** If $4 < x \leq 7$ what is the range of $y = 3x - 5$?

4. **VERBALLY** For the last 20 years, Mr. Bean has weighed 120 pounds give or take 4 four pounds.

a. Write a compound inequality representing all possible weights for Mr. Bean.

b. Which absolute value inequality correctly represents all possible weights for Mr. Bean?

A
 $|x - 4| \geq 120$

B
 $|x - 120| \geq 4$

C
 $|x - 4| \leq 120$

D
 $|x - 120| \leq 4$

c. The equation from letter b is actually used all the time in manufacturing. Take Mr. Brust's favorite cereal, Fruity Pebbles. The net weight of the box says 14.5 ounces, but actually Post Foods is cool with any weight that is 14.5 ± 0.25 ounces. Write an absolute value inequality to represent all possible weights for the box of Fruity Pebbles.



d. The equation used above is called Tolerance and is used whenever you can "tolerate" something for a given interval. The absolute value inequality below represents how long (in minutes) Mr. Brust can watch one of Mr. Bean's math videos before falling asleep. Write a sentence explaining how long Mr. Brust can tolerate one of Mr. Bean's videos.

$$|x - 8| \leq 0.5$$

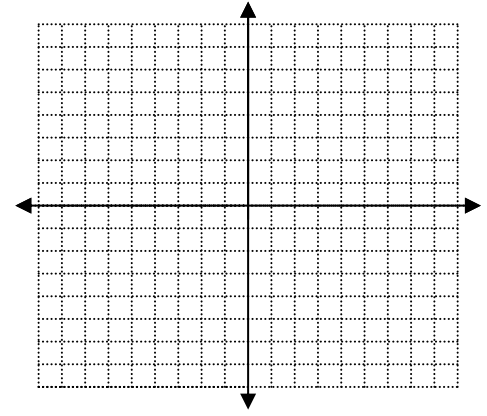


5. **NUMERICALLY** Graph $f(x) = 2|x - 3| - 4$ by first completing the table, and then plotting the points.

x	$f(x)$	x	$f(x)$
-3		3	
-2		4	
-1		5	
0		6	
1		7	
2			24

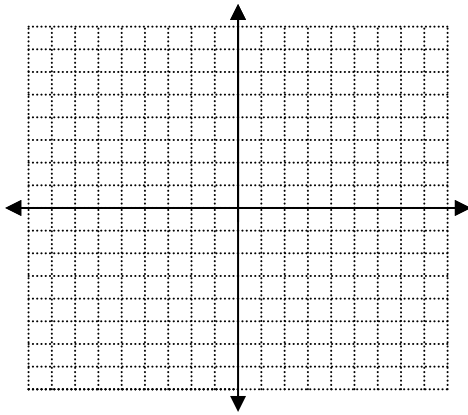
Domain =

Range =



6. **ALGEBRAICALLY** Solve the following equation: $4 = |x + 3| - 2$

7. **GRAPHICALLY** Solve the same equation from #6 by using graphs. When two graphs intersect, the point(s) where they cross are solutions. Graph both the right and left side of the equation to find the point(s) of intersection. A table is provided to help with part b.



$$4 = |x + 3| - 2$$

- Graph $y = 4$ (the left side of the equation)
- Graph $y = |x + 3| - 2$ (right side of the equation)
- Circle where the graphs intersect.
- Does this match your solutions from #6?

x	y
-6	
-5	
-4	
-3	
-2	
-1	
0	

8. **SAT PREP** Below are sample SAT questions. The SAT is the main standardized test that colleges look at for admission. One is multiple choices; the other is free response where you must grid in your answer. Blow it up.

MULTIPLE CHOICE

If w is an integer and $-|w^2| = w^3$, then which of the following is a possible value of w ?

- 2
- 1
- 1
- 2
- 3

GRID IN

If p and q are consecutive negative odd integers whose sum is -120 and $q < p$, what is the value of $|q - p|$?

•	•	•	•
	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9