Ch 5 Notes VIDEO

Saturday, October 22, 2022 9:54 AM

Credit Recovery Algebra 1 Sem 1 Ch 5 Notes: Absolute Value Functions

Name_____

Day	Date	Assignment (Due the next class meeting)
Tuesday Monday	11/22/22 11/28/22	5.1Worksheet
Tuesday Wednesday	11/29/22 11/30/22	5.2Worksheet
Thursday Friday	12/01/22 12/02/22	5.3Worksheet
Monday Tuesday	12/05/22 12/06/22	5.4 Worksheet
Wednesday Thursday	12/07/22 12/08/22	Ch 5 Review Wk
Friday Monday	12/09/22 12/12/22	Ch 5 Big Quiz HW: Sem 1 Rev Wk #1
Tuesday Wednesday	12/13/22 12/14/22	Sem Rev Wk #2
Thursday Friday	12/15/22 12/16/22	Practice Final
Monday	12/19/22	C day: STUDY!
Tuesday Wednesday Thursday	12/20/22 12/21/22 12/22/22	Final Exams

NOTE: Be prepared for daily quizzes.

- HW is due the next class meeting.
- Late HW is reduced by 50% of the score.
- Students with 100% homework completion and no missing homework for the semester will get a 2% grade increase.
- Students with 100% homework completion AND no late/missing homework for the semester will be rewarded with a pizza party.
- See www.washoeschools.net/DRHSmath if you need handouts for this class.

5.1 Notes: More Domain and Range

Key Terms

Domain : the set of all inputs (x's) from graph

Some options: $\mathbb{R}$ ← "all real #s"

$x >$ $x \geq$

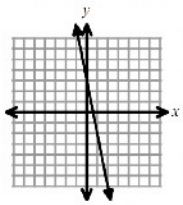
Range : the set of all outputs (y)

Options: $\mathbb{R}$

$y >$ $y <$ $y \geq$ $y \leq$

For #1 – 6, find the domain and range of each function.

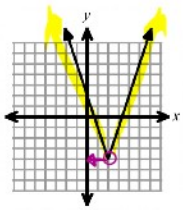
1)



D: $\mathbb{R}$

R: $\mathbb{R}$

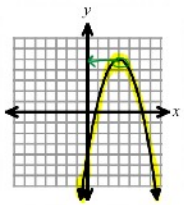
2)



D: $\mathbb{R}$

R: $y \geq -4$

3)

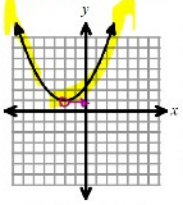


D: $\mathbb{R}$

R: $y \leq 5$

You try #4 – 6 !

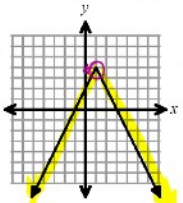
4)



D: $\mathbb{R}$

R: $y \geq 1$

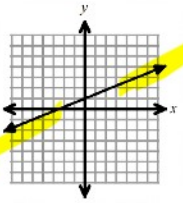
5)



D: $\mathbb{R}$

R: $y \leq 4$

6)

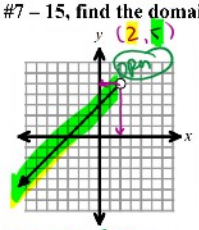


D: $\mathbb{R}$

R: $\mathbb{R}$

For #7 – 15, find the domain and range of each function.

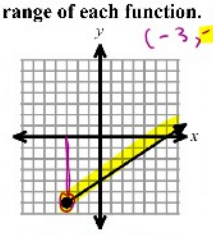
7)



D: $x < 2$

R: $y > 5$

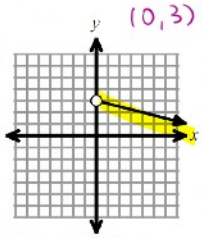
8)



D: $x \geq -3$

R: $y \geq -6$

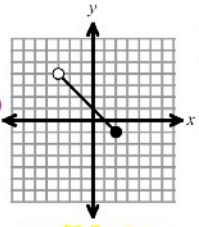
9) You try!



D: $x > 0$

R: $y < 3$

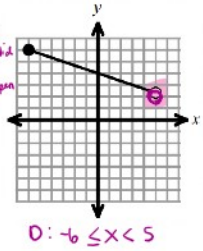
10)



D: $-3 < x \leq 2$

R: $-1 \leq y < 4$

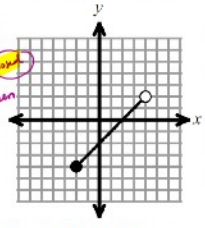
11)



D: $-6 \leq x < 5$

R: $2 < y \leq 6$

12) You try!



D: $-2 \leq x < 4$

R: $-4 \leq y < 2$

$(-6, 6)$

$(5, 2)$

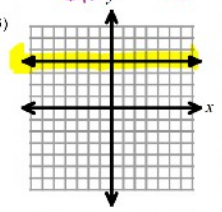
$m = \frac{-4}{11}$

$y - -\frac{4}{11}(x-5)+2$

D: $-3 \le x \le 2$

R: $-1 \le y < 4$ (smallest y ↑ biggest)

13)



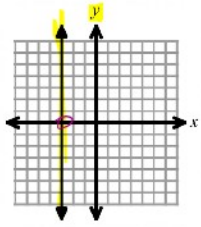
D: ℝ

R: $y = 4$

D: $-6 \le x < 5$

R: $2 < y \le 6$

14) Not a function…



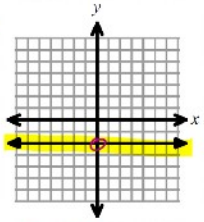
D: $x = -3$

R: ℝ

D: $-2 \le x < 4$

R: $-4 \le y < 2$

15) **You try!**



D: ℝ

R: $y = -2$

3

$y = -\frac{4}{11}(x-5)+2$

5.2 Notes: Graphing Absolute Value Functions

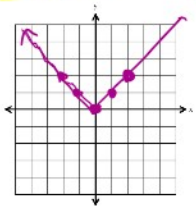
Objectives:

- Students will be able to graph absolute value functions.
- Students will be able to identify domain, range, and vertex of absolute value functions.

Example 1: Use a table of values to graph the functions $y = |x|$. ← "V"-shaped graphs

a) $y = |x|$

x	$y = \lvert x \rvert$	
2	$\lvert 2 \rvert = 2$	(2, 2)
1	$\lvert 1 \rvert = 1$	(1, 1)
0	$\lvert 0 \rvert = 0$	(0, 0)
−1	$\lvert -1 \rvert = 1$	(−1, 1)
−2	$\lvert -2 \rvert = 2$	(−2, 2)



Domain:

Range:

Vertex:

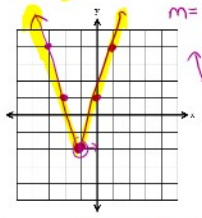
(h, k) Form of an Absolute Value Function: $y = m|x - h| + k$

m = "slope"

(h, k) point on the "Vertex" ↳ bottom/top of V

For Examples #2 – 4: Graph each absolute value function. Name the vertex, domain, and range.

2) $y = 3|x + 1| - 2$ $m = \frac{3}{1}$ ↑ ↔

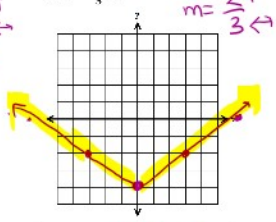


Vertex: (−1, −2)

Domain: ℝ

Range: $y \ge -2$

3) $y = \frac{2}{3}|x| - 4$ $m = \frac{2}{3}$ ↑ ↔

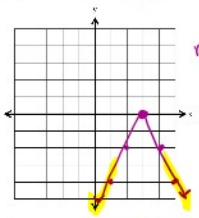


Vertex: (0, −4)

Domain: ℝ

Range: $y \ge -4$

4) $y = -2|x - 3| + 0$ $m = \frac{-2}{1}$ ↓ ↔



Vertex: (3, 0)

Domain: ℝ

Range: $y \le 0$

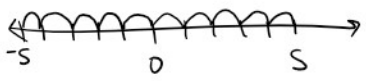
4

How many units away from 0?

$|5| = 5$ (right)

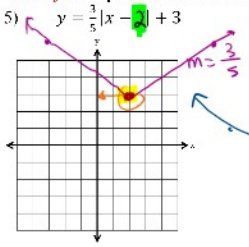
$|-5| = 5$ (left)

$|\ | =$ positive



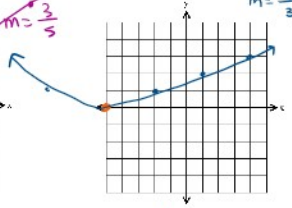
You try! Graph each absolute value function. Name the vertex, domain, and range.

5) $y = \frac{3}{5}|x - 2| + 3$



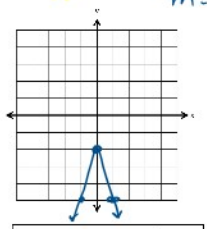
Vertex: (2, 3)
Domain: R
Range: $y \geq 3$

6) $y = \frac{1}{3}|x + 5|$ to



Vertex: (−5, 0)
Domain: R
Range: $y \geq 0$

7) $y = -3|x| - 2$



Vertex: (0, −2)
Domain: R
Range: $y \leq -2$

A **parent function** is the most basic form of a family of functions. The parent function for Absolute Value functions is : $y = |x|$

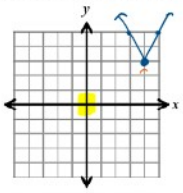
Transformations from the parent function:

change

Shifts	Reflection	Stretch	Compression
↔ h	~~slope is neg?~~	$m > 1$	$-1 < m < 1$
↕ k	reflection	$m < -1$	

For # 8 – 9: Graph each function. Describe the transformations form the parent function $y = |x|$

8) $y = 2|x - 4| + 3$

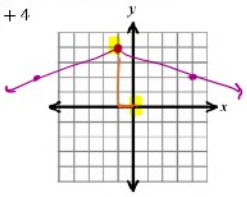


Vertex (4, 3)
$m = \frac{2}{1}$ ↑ ↔

Transforms
→ 4
↑ 3

Stretch

9) $y = -\frac{2}{5}|x + 1| + 4$



Vertex (−1, 4)
$m = -\frac{2}{5}$ ↓ ↔

transform?
← 1 ↑ 4 reflection compression

5.3 Notes: Solving Absolute Value Equations → find the value of x

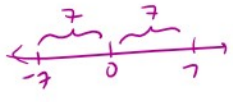
Objective: Students will be able to solve absolute value equations algebraically.

Absolute Value:

* distance from 0

$|7| = 7$

$|-7| = 7$



Solving Absolute Value Equations:

* |inside| = right ← ignore
* ① cancel outsides #
  → Never ever distribute | |.
* ② make 2 equations: |inside| = pos number × outside
  - inside = +
  - inside = neg
* Step 2: |inside| = neg → STOP! ∅ No solution
* ③ Solve (2 answers)

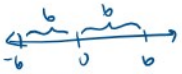
Examples #1 – 6: Solve for x in each equation below.

1) $|x| = 6$

What #s are 6 units away from 0?

① $x = 6$ ② $x = -6$

$x = \pm 6$



2) $|4x - 3| = 6$

① $4x - 3 = 6$ (+3 +3) → $4x = 9$ → $x = \frac{9}{4}$

② $4x - 3 = -6$ (+3 +3) → $4x = -3$ → $x = -.75$

$x = 2.25$ or -0.75

3) $|x| - 3 = 6$ (+3 +3)

$|x| = 9$

① $x = 9$ ② $x = -9$

$x = \pm 9$

You try! Solve for x in each equation below.

4) $|x| = 10$

$x = 10$ $x = -10$

$x = \pm 10$

5) $|x| + 4 = 11$ (−4 −4)

$|x| = 7$

① $x = 7$ ② $x = -7$

$x = \pm 7$

6) $|3x + 1| = 16$

① $3x + 1 = 16$ (−1 −1) → $3x = 15$ → $x = 5$

② $3x + 1 = -16$ (−1 −1) → $3x = -17$ → $x = -5.\overline{6}$

$x = 5$ or $-5.\overline{6}$

Examples 7 – 8: Solve for x in each equation below.

7) $10|x| - 14 = 6$

$+14 \quad +14$

$10|x| = 20$

$10 \quad 10$

$|x| = 2$

① $x = 2$ ② $x = -2$

$x = \pm 2$

8) $\frac{1}{3}|x + 2| = -6$ $\cdot -3$

$|x+2| = 18$

① $x + 2 = 18$ $-2 \quad -2$ ② $x + 2 = -18$ $-2 \quad -2$

$x = 16$ OR $x = -20$

You try! For #9 – 10: Solve for x in each equation below.

9) $\frac{1}{5}|x| - 4 = 2$

$+4 \quad +4$

$\frac{1}{5}|x| = 6$ $\cdot 5$

$|x| = 30$ pos

① $x = 30$ ② $x = -30$

$x = \pm 30$

10) $-5|x - 3| + 1 = -9$

$-1 \quad -1$

$-5|x-3| = -10$

$-5 \quad -5$

$|x - 3| = 2$ positive

① $x - 3 = 2$ $+3 \quad +3$ ② $x - 3 = -2$ $+3$

$x = 5$ OR $x = 1$

Absolute Value Equations with No Solution

$|\text{inside}| = \text{neg}$? ⇒ STOP! ∅ No Solution

Examples 11 – 14: Solve for x, if possible.

11) $-2|x - 4| + 16 = 20$

$-16 \quad -16$

$-2|x-4| = 4$

$-2 \quad -2$

$|x-4| = -2$ pos ?

neg!!

∅ No Solution

12) $-5|-3x + 1| + 6 = -14$

$-6 \quad -6$

$-5|-3x+1| = -20$

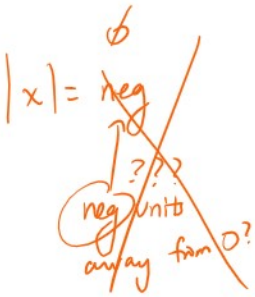
$-5 \quad -5$

$|-3x+1| = 4$ pos :)

① $-3x + 1 = 4$ $-1 \quad -1$ ② $-3x + 1 = -4$ $-1 \quad -1$

$-3x = 3$ $-3 \quad -3$ $-3x = -5$ $-3 \quad -3$

$x = -1$ or $x = 1.\overline{6}$



5.4 Notes: Extra Topics

Objectives:

- Students will be able graph linear inequalities
- Students will be able to write explicit forms for arithmetic sequences

Graphing Linear Inequalities

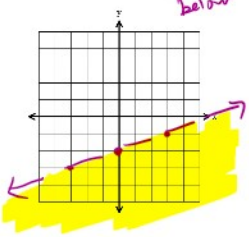
$y < mx+b$

① Plot b (y-int)
② Use m (slope) to find 2nd pt
③ Decide: solid or dotted line?
④ Decide: where do you shade (above/below)?

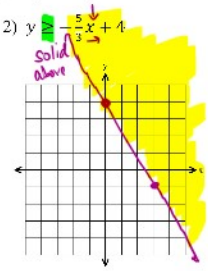
$<$	$\leq$	$>$	$\geq$
dotted below	solid line below	dotted above	solid line above

For #1 – 6: Graph each linear inequality.

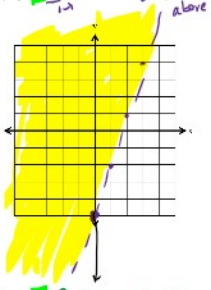
1) $y < \frac{1}{3}x - 2$ dotted below



2) $y \geq -\frac{5}{3}x + 4$ solid above

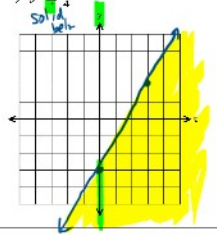


3) $y > 3x - 5$ dotted above

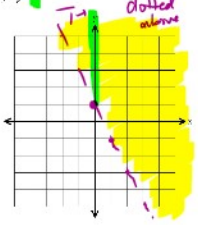


You try!

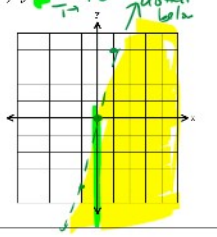
4) $y \leq \frac{5}{4}x - 3$ solid below



5) $y > -2x + 1$ dotted above



6) $y < 4x + 0$ dotted below

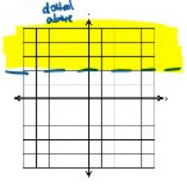


$y = \#$ ⟷ $x = \#$ ↕

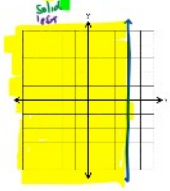
Credit Recovery Algebra 1 Sem 1 Ch 5 Notes: Absolute Value Functions

For #7 – 10: Graph each linear inequality. **You try #9 – 10!**

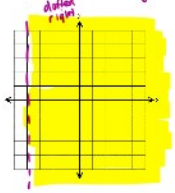
7) $y \geq 2$ solid above



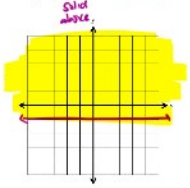
8) $x \leq 3$ solid left



9) $x > -4$ dotted right



10) $y \geq -1$ solid above



Arithmetic Sequence

* list with a pattern
* add/or subtract the same over & over again
  * common difference (d)
  * slope (m)
  * rate of change

1st term, 2nd term, 3rd term

a_1, a_2, a_3

7/5 8, 6, 4, 2, 0, -2, . . .

$d = -2$ -2 a_6

Explicit Formula for an Arithmetic Sequence: $a_n = dn + a_0$

"a_n sub n"

input, output, common diff, y-int, zero term

$y = mx + b$

$y = mx + b$

For #11 – 14, Write the explicit formula for each arithmetic sequence below.

11) -5, -2, 1, 4, 7, …

a_1 a_2 a_3

-8 , +3 +3 +3 +3 $d = 3$

$a_n = dn + a_0$

-5-3

$a_n = 3n - 8$

12) 11, 6, 1, −4, −9, …

16 , −5 −5 −5 −5 $d = -5$

11+5

$a_n = dn + a_0$

$a_n = -5n + 16$

13) −9, 2, 13, 24, 35, …

-9 , +11 +11 +11 +11

2-11

$a_n = 11n - 9$

14) −6, −10, −14, −18, …

-2 , −4 −4 −4 $d = -4$

-6+4

$a_n = -4n - 2$