

Algebra 2 Trigonometry Unit 1 Review
Absolute Value Functions and Equations

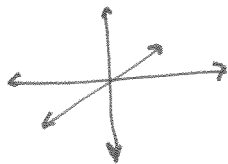
Name Key
 Date _____ Block _____

This review is a resource that you are to use to help you prepare for the unit assessment. It is not comprehensive. Review all materials from the unit and evaluate your own level of mastery for each skill set area. Use all resources available to you, as needed, to best prepare for the unit assessment.

Skill Set A: Identify each function family by its equation and the shape of its graph

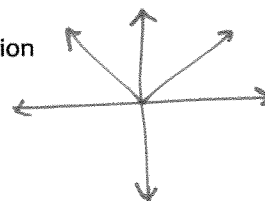
1-10: For each function family, state the parent function and sketch its graph.

1. Identity Function



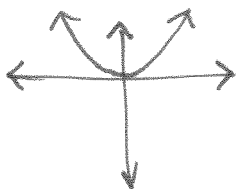
EQ: $f(x) = x$

2. Absolute Value Function



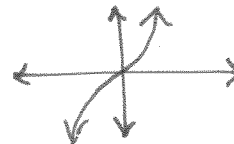
EQ: $f(x) = |x|$

3. Square Function



EQ: $f(x) = x^2$

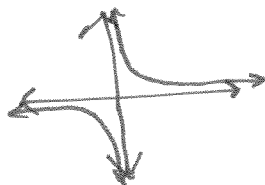
4. Cubic Function



EQ: $f(x) = x^3$

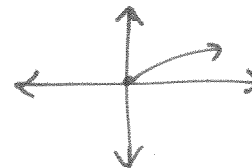
5. Reciprocal Value Function

↑
unit



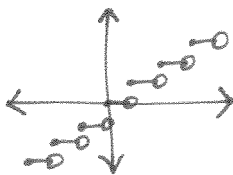
EQ: $f(x) = \frac{1}{x}$

6. Square Root Function



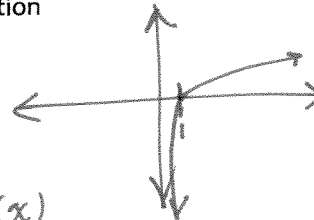
EQ: $f(x) = \sqrt{x}$

7. Greatest Integer Function



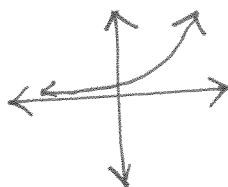
EQ: $f(x) = [x]$

8. Logarithmic Function



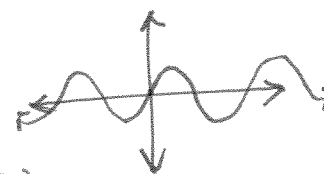
EQ: $f(x) = \log(x)$

9. Exponential Function



EQ: $f(x) = 2^x$

10. Sine Function



EQ: $f(x) = \sin(x)$

Skill Set B: Algebra I Prerequisite Skills: Solve linear equations and inequalities; graph linear functions and inequalities

11-12: Solve each equation for the indicated variable. Circle your final solution.

11. Solve for \underline{h} : $A = \frac{1}{2}(b \cdot h)$

$$\frac{2A}{b} = \frac{b \cdot h}{b}$$

$$\frac{2A}{b} = h$$

$$\boxed{h = \frac{2A}{b}}$$

12. Solve for \underline{L} : $P = 2L + 2W$

$$\frac{P - 2W}{2} = \frac{2L}{2}$$

$$\frac{P - 2W}{2} = L$$

$$\boxed{L = \frac{P}{2} - W}$$

$$\boxed{L = \frac{P - 2W}{2}}$$

13-18: Solve each equation or inequality. Show your work and circle your final solution. Graph the solution set for each inequality on a number line.

13. $5x < 9 + 2x$ or $9 - 2x > 11$

$3x < 9$ or $-2x > 2$

$x < 3$ or $x < -1$



$x < 3$

14. $\frac{1}{5}x + \frac{3}{10} = \frac{2}{30}x - 5$

$6x + 9 = 2x - 150$

$4x = -159$

$x = \frac{-159}{4}$

15. $-8 \leq 3x - 20 \leq 52$

$\frac{12}{3} \leq 3x \leq \frac{72}{3}$

$4 \leq x \leq 24$



16. $1 + 5(x - 8) \leq 2 - (x - 5)$

$1 + 5x - 40 \leq 2 - x + 5$

$5x - 39 \leq -x + 7$

$6x \leq 46$

$x \leq \frac{46}{6}$

$x \leq \frac{23}{3}$

17. $0.75(8x + 20) = 3 + 2(x - 1)$

$\frac{3}{4}(8x + 20) = 3 + 2x - 2$

$6x + 15 = 1 + 2x$

$4x = -14$

$x = \frac{-14}{4}$

$x = \frac{-7}{2}$

18. $-3(4w - 1) > 18$

$4w - 1 > -6$

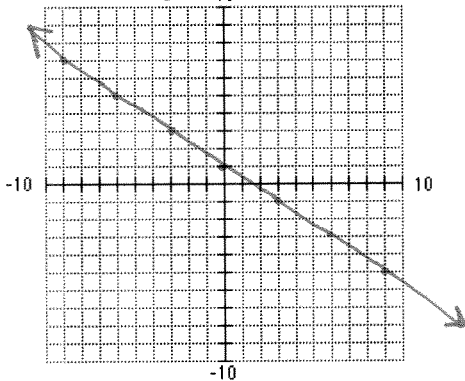
$4w > -5$

$w > \frac{-5}{4}$

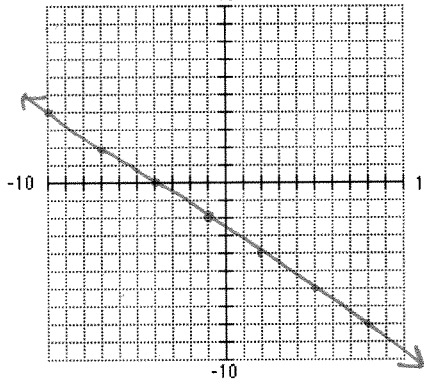


19-24: Graph each function or inequality.

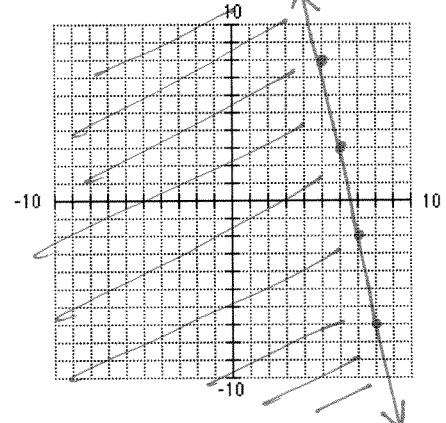
19. $f(x) = -\frac{2}{3}x + 1$



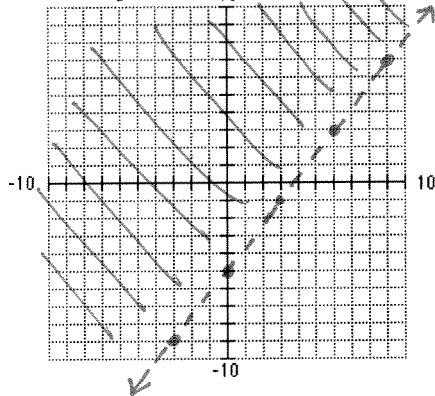
20. $f(x) = -\frac{2}{3}(x + 1) - 2$



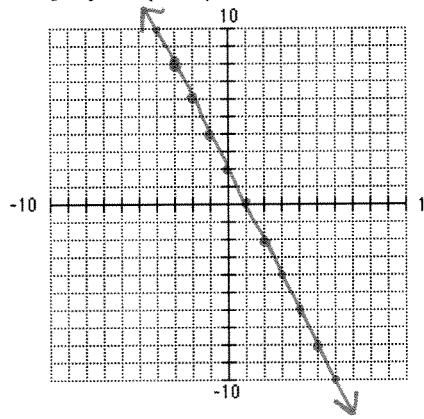
21. $y \leq -5(x - 5) + 8$



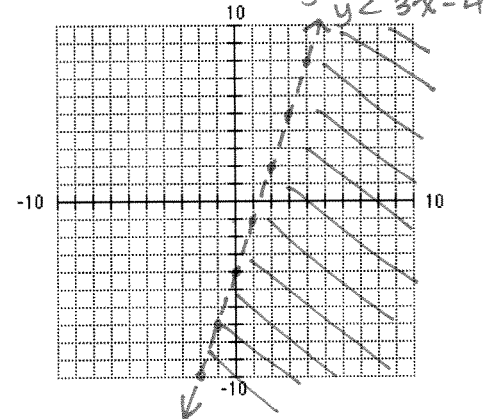
22. $y > \frac{4}{3}x - 5$



23. $y = -2(x + 3) + 8$



24. $3x - y > 4$



Skill Set C: Solve absolute value equations and inequalities

25-26: Evaluate each expression if $a = -3$, $b = 7$, and $c = -2$. Show your work and circle your final solution.

25. $3|a - b| + c$

$= 3|-3 - 7| - 2$

$= 3|-10| - 2$

$= 3(10) - 2$

$= 30 - 2 = 28$

26. $a|b - 7| - c|a|$

$= -3|7 - 7| - (-2)|-3|$

$= -3(0) + 2(3)$

$= 0 + 6$

$= 6$

Key ✓

27-38: Solve each absolute value equation or inequality. State the solution using set builder notation.

27. $|t-3|-8=0$
 $|t-3|=8$
 $t-3=-8 \quad t-3=8$
 $t=-5, t=11$

28. $|3x+2| \leq 7$
 set up: $3x+2$
 $-7 \leq 3x+2 \leq 7$
 $-9 \leq 3x \leq 5$
 $-3 \leq x \leq \frac{5}{3}$

29. $|7+3a|=11-a$
 $7+3a=-(11-a) \quad 7+3a=11-a$
 $7+3a=-11+a \quad 4a=4$
 $2a=-18 \quad a=1$
 $a=-9$
 $a=-9, a=1$

30. $|x+2| \leq 2x+7$
 set up:
 $-2x-7 \leq x+2 \leq 2x+7$
 $-2x-7 \leq x+2$ AND $x+2 \leq 2x+7$
 $-3x \leq 9$ AND $-x \leq 5$
 $x \geq -3$ AND $x \geq -5$
 solution set: $x \geq -3$

31. $\frac{-2|7x|}{-2} > \frac{56}{-2}$
 $|7x| < -28$
 no solution

32. $|x+8|-3=-3$
 $|x+8|=0$
 $x+8=0$
 $x=-8$

33. $\frac{-6|2x-14|}{-6} = \frac{42}{-6}$
 $|2x-14| = -7$
 no solution

34. $|x+8| > 3$
 $x+8 < -3$ or $x+8 > 3$
 $x < -11$ or $x > -5$

35. $\frac{4|2x|}{4} \geq \frac{-64}{4}$
 $|2x| \geq -16$
 all real numbers

36. $3|x-5|-7=2$
 $3|x-5| = \frac{9}{3}$
 $|x-5|=3$
 $x-5=-3 \quad x-5=3$
 $x=2, x=8$

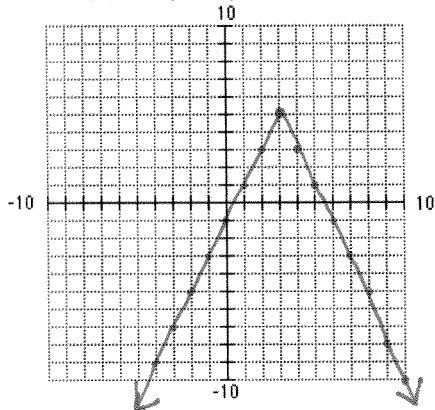
37. $-2|7-3y|-6=-14$
 $-2|7-3y|=-8$
 $|7-3y|=4$
 $7-3y=-4 \quad 7-3y=4$
 $-3y=-11 \quad -3y=-3$
 $y=\frac{11}{3} \quad y=1$

38. $2|4-3x|=10x+24$
 $|4-3x|=5x+12$
 $4-3x=-(5x+12) \quad 4-3x=5x+12$
 $4-3x=-5x-12 \quad -8x=8$
 $2x=-16 \quad x=-1$
 ~~$x=-8$~~
 extraneous

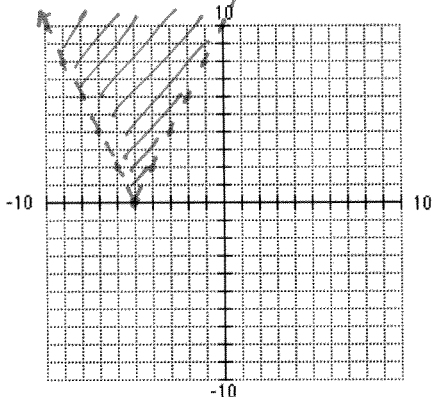
Skill Set D: Graph absolute value functions and inequalities

39-44: Graph each absolute value function or inequality.

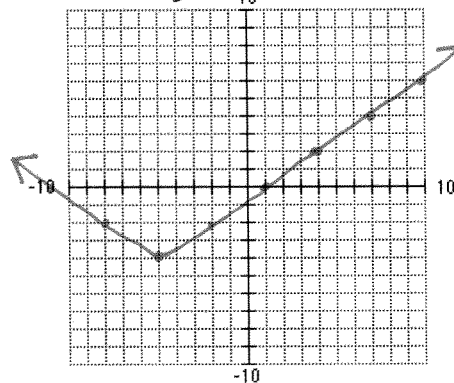
39. $f(x) = -2|x - 3| + 5$



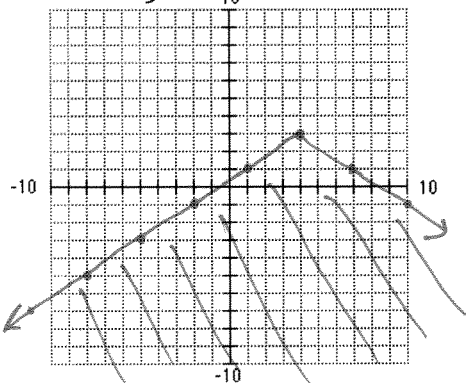
40. $y > 2|x + 5|$



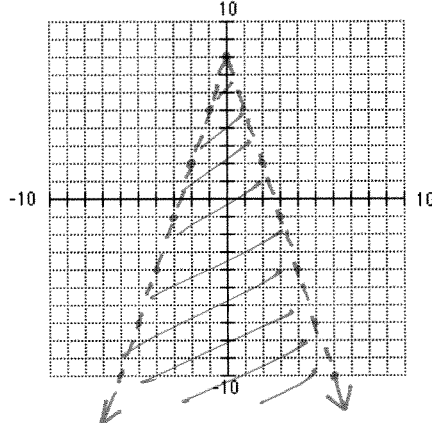
41. $y = \frac{2}{3}|x + 5| - 4$



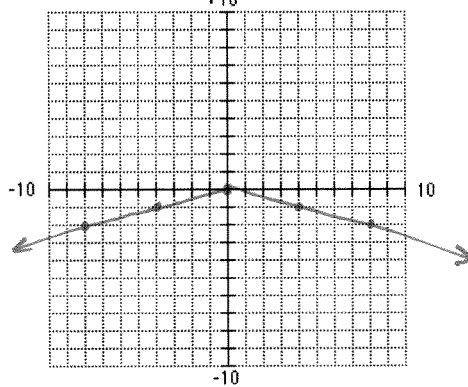
42. $y < -\frac{2}{3}|x - 4| + 3$



43. $y + 3|x| < 8$ $y < -3|x| + 8$



44. $f(x) = -\frac{1}{4}|x|$



Skill Set E: Describe the transformation of the graph of a linear or absolute value function as compared to the graph of the parent function

45-48: Given the parent functions $f(x) = x$ and $f(x) = |x|$, completely describe the transformation of the graph of the function as compared to the parent graph.

45. $f(x) = 2|x| - 5$

The graph is:

- shifted down 5 units and
- stretched by a factor of 2. (more narrow)

46. $f(x) = 4(x + 6) - 2$

The graph is:

- shifted left 6 units and down 2 unit.
- stretched by a factor of 4 (more narrow)

47. $f(x) = -3|x - 2| + 3$

The graph is:

- shifted right 2 units and up 3 units
- reflected across the x-axis (opens downward)
- stretched by a factor of 3 (more narrow)

48. $f(x) = \frac{1}{2}|x| - 7$

The graph is:

- shifted down 7 units
- compressed by a factor of $\frac{1}{2}$. (wider)