

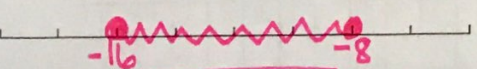
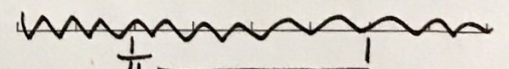


Algebra II
Absolute Value, Piecewise and Radical Functions Review

Solve the following absolute value equations algebraically. Circle or box your answer.

| | | |
|--|---|---|
| <p>1. $9x-2 =7$</p> <p>$9x-2=7$ $9x-2=-7$</p> <p>$9x=9$ $9x=-5$</p> <p>$x=1$ $x=-\frac{5}{9}$</p> | <p>2. $2x-4 =6x$</p> <p>$2x-4=6x$ $2x-4=-6x$</p> <p>$-4=4x$ $-4=-8x$</p> <p>$-1=x$ $\frac{1}{2}=x$</p> <p>extraneous</p> | <p>3. $-5x+1 =-3$</p> <p>$-5x+1=-3$ $-5x+1=3$</p> <p>$-5x=-4$ $-5x=2$</p> <p>$x=\frac{4}{5}$ $x=-\frac{2}{5}$</p> <p>N.S.</p> |
|--|---|---|

Solve the following absolute value inequalities. Graph the solution set.

| | |
|--|---|
| <p>4. $x-2 < 4$</p> <p>$x-2 < 4$ AND $x-2 > -4$</p> <p>$x < 6$ $x > -2$</p>  <p>Solution: $(-2, 6)$</p> | <p>5. $2x+3 \geq 1$</p> <p>$2x+3 \geq 1$ OR $2x+3 \leq -1$</p> <p>$2x \geq -2$ $2x \leq -4$</p> <p>$x \geq -1$ $x \leq -2$</p>  <p>Solution: $(-\infty, -2] \cup [-1, \infty)$</p> |
| <p>6. $\frac{1}{4}x+3 \leq 1$</p> <p>$\frac{1}{4}x+3 \leq 1$ AND $\frac{1}{4}x+3 \geq -1$</p> <p>$\frac{1}{4}x \leq -2$ $\frac{1}{4}x \geq -4$</p> <p>$x \leq -8$ $x \geq -16$</p>  <p>Solution: $[-16, -8]$</p> | <p>7. $8x-5 > -3$</p> <p>$8x-5 > -3$ OR $8x-5 < 3$</p> <p>$8x > 2$ $8x < 8$</p> <p>$x > \frac{1}{4}$ $x < 1$</p>  <p>Solution: $(\frac{1}{4}, 1)$</p> |

Identify the vertex of the function, tell whether the function opens up or down, and tell whether the graph is wider, narrower, or the same width as the graph of $f(x) = |x|$.

8. $f(x) = 3|x| + 2$ Vertex: $(0, 2)$ Opens: Up Width: Narrower
9. $g(x) = -|x+1| - 5$ Vertex: $(-1, -5)$ Opens: Down Width: Same
10. $h(x) = \frac{1}{2}|x-3|$ Vertex: $(3, 0)$ Opens: Up Width: Wider

11. Analyze the characteristics of the function shown in the graph.

a. domain: $(-\infty, \infty)$

b. range: $(-\infty, \infty)$

c. x-intercept(s): $(-1, 0), (0, 0)$ y-intercept: $(0, 0)$

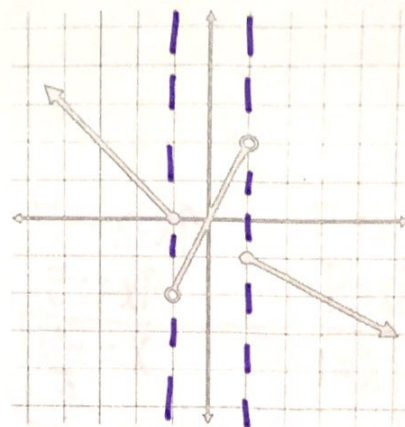
d. x-coordinate of point(s) of discontinuity: $-1 \& 1$

e. interval of increase: $(-1, 1)$

f. interval of decrease: $(-\infty, -1] \cup [1, \infty)$

g. Equation:

$$f(x) = \begin{cases} -x-1, & \text{if } x \leq -1 \\ 2x, & \text{if } -1 < x < 1 \\ -\frac{1}{2}x - \frac{1}{2}, & \text{if } x \geq 1 \end{cases}$$



Use the function $f(x) = \begin{cases} 3x+2, & x \leq 3 \\ x-1, & x > 3 \end{cases}$ to evaluate the following:

12. $f(5) = 4$

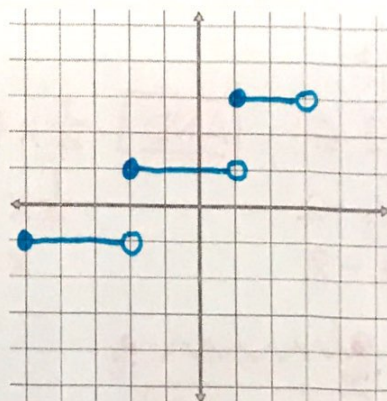
13. $f(0) = 2$

14. $f(3) = 11$

$\sqrt{5} > 3$ $5-1=4$ $\sqrt{0} \leq 3$ $3(0)+2=2$ $\sqrt{3} \leq 3$ $3(3)+2=11$

Graph the following piece-wise defined function:

15. $f(x) = \begin{cases} -1 & \text{if } -5 \leq x < -2 \\ 1 & \text{if } -2 \leq x < 1 \\ 3 & \text{if } 1 \leq x < 3 \end{cases}$



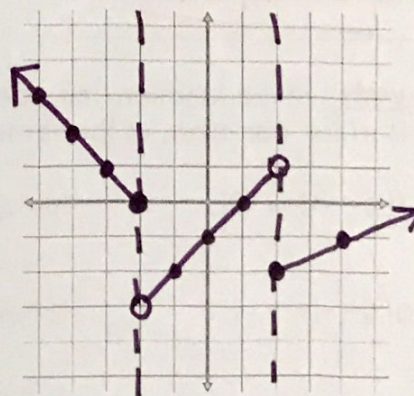
16. $f(x) = \begin{cases} -x-2 & x \leq -2 \text{ Left} \\ x-1 & -2 < x < 2 \text{ Middle} \\ \frac{1}{2}x-3 & x \geq 2 \end{cases}$

$f(-2) = -(-2)-2 = 2-2 = 0$
 $(-2, 0)$

$f(-2) = -2-1 = -3$
 $(-2, -3)$

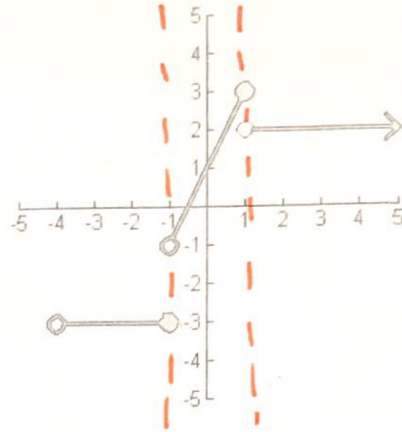
$f(2) = 2-1 = 1$
 $(2, 1)$

$f(2) = \frac{1}{2}(2)-3 = 1-3 = -2$
 $(2, -2)$



17. Write the equation for the **piecewise function** whose graph is shown. Include the appropriate restrictions on the domain.

$$f(x) = \begin{cases} -3, & \text{if } -4 < x \leq -1 \\ 2x+1, & \text{if } -1 < x \leq 1 \\ 2, & \text{if } x > 1 \end{cases}$$



Solve.

18. $\sqrt{5x-4} + 2 = x$
 $(\sqrt{5x-4})^2 = (x-2)^2$
 $5x-4 = (x-2)(x-2)$
 $5x-4 = x^2 - 4x + 4$
 $0 = x^2 - 9x + 8$
 $0 = (x-8)(x-1)$
 $x = 8$

19. $(\sqrt[3]{5x-8})^3 = (\sqrt[3]{12-3x})^3$
 $5x-8 = 12-3x$
 $8x-8 = 12$
 $8x = 20$
 $x = 2.5$

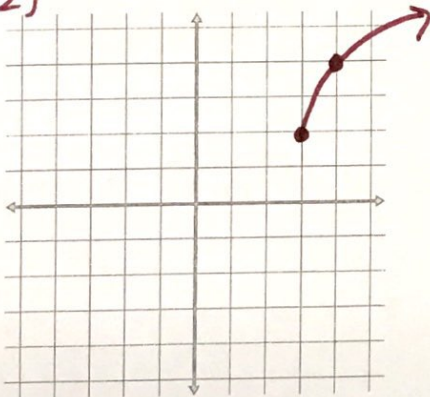
20. $(7p-1)^{\frac{1}{3}} + 11 = 7$
 $[(7p-1)^{\frac{1}{3}}]^3 = (-4)^3$
 $7p-1 = -64$
 $7p = -63$
 $p = -9$

Graph the following functions and tell the transformations for each.

21. $f(x) = 2\sqrt{x-3} + 2$

(h,k): (3,2)

| x | y |
|---|---|
| 3 | 2 |
| 4 | 4 |
| 7 | 6 |

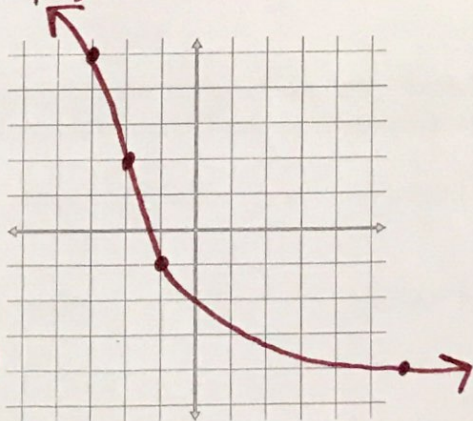


| | |
|-------------------------------|-----------------|
| Starting Pt: (3, 2) | Inc or Dec: Inc |
| Domain: [3, ∞) | Range: [2, ∞) |
| Abs. Max or Abs Min: Abs Min | |
| End Behavior: x → ∞, f(x) → ∞ | x → 3, f(x) → 2 |

22. $y = -3\sqrt[3]{x+2} + 2$

(h,k): (-2, 2)

| x | y |
|-----|----|
| -10 | 8 |
| -3 | 5 |
| -2 | 2 |
| -1 | -1 |
| 6 | -4 |



| | |
|--------------------------------|------------------|
| Starting Pt: (-2, 2) | Inc or Dec: Dec |
| Domain: (-∞, ∞) | Range: (-∞, ∞) |
| Abs. Max or Abs Min: NONE | |
| End Behavior: x → ∞, f(x) → -∞ | x → -∞, f(x) → ∞ |