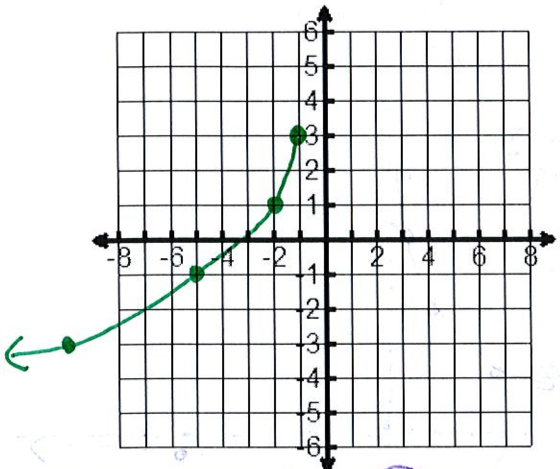
**Name** Key **Date** ________

**Graph each function, fill in the chart, and make a table of points.**

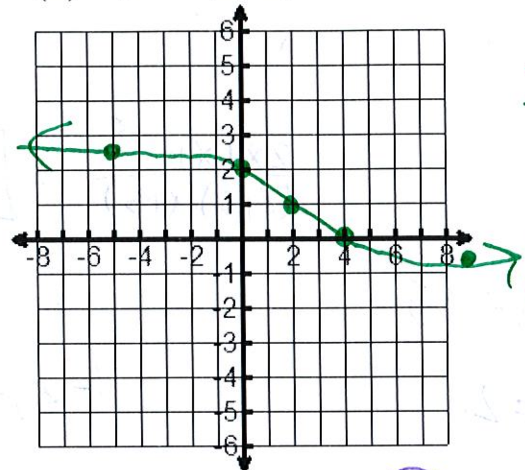
1. $f(x) = -2\sqrt{-(x+1)} + 3$



| x | y |
|---|---|
| -1 | 3 |
| -2 | 1 |
| -5 | -1 |
| -10 | -3 |

| | |
|---|---|
| Starting Pt: (-1,3) | Inc or Dec: Inc |
| Domain: $(-\infty, -1]$ | Range: $(-\infty, 3]$ |
| Abs. Max or Abs Min: @ | (-1,3) |
| End Behavior: $x \to -\infty$, $f(x) \to -\infty$ $x \to -1$, $f(x) \to 3$ | |

2. $f(x) = \sqrt[3]{-1/2(x-2)} + 1$



| x | y |
|---|---|
| -5 | 2.5 |
| 0 | 2 |
| 2 | 1 |
| 4 | 0 |
| 9 | -.5 |

| | |
|---|---|
| Starting Pt: (2,1) | Inc or Dec: Dec |
| Domain: $(-\infty, \infty)$ | Range: $(-\infty, \infty)$ |
| Abs. Max or Abs Min: | n/a |
| End Behavior: $x \to -\infty$, $f(x) \to \infty$ $x \to \infty$, $f(x) \to -\infty$ | |

**Using the graph of $f(x) = \sqrt{x}$ as a guide, describe the transformation.**

3. $g(x) = 4\sqrt{-\frac{1}{3}(x+8)} - 1$ Vertical Stretch 4, reflect across y-axis, horizontal stretch 3
left 8, down 1

4. $g(x) = -\sqrt{3(x+17)} + 29$ Reflect over x-axis, horizontal shrink 1/3, left 17, up 29

**Use the description to write the square root function g.**

5. The parent function $f(x) = \sqrt{x}$ is reflected across the $y$-axis, vertically stretched by a factor of 7, and translated 3 units down.

$g(x) = 7\sqrt{-x} - 3$

6. The parent function $f(x) = \sqrt{x}$ is translated 2 units right, reflected across the x-axis, and compressed horizontally by a factor of $\frac{1}{2}$.

$g(x) = -\sqrt{2(x-2)}$

7. The parent function $f(x)=\sqrt{x}$ is compressed vertically by a factor of 1/4, reflected across the x-axis, and translated 6 units up.

$g(x)=\frac{1}{4}\sqrt{x}+6$

8. The parent function $f(x)=\sqrt{x}$ is translated 8 units left, reflected across the y-axis, and stretched horizontally by a factor of 3.

$g(x)=\sqrt{-\frac{1}{3}(x+8)}$

9. $f(x)=\dfrac{2x^2+4x}{x^2+7x+10}$ $\dfrac{2x\cancel{(x+2)}}{\cancel{(x+2)}(x+5)}=\boxed{\dfrac{2x}{x+5}}$ hole: $\dfrac{2(-2)}{-2+5}$

Vertical Asymptote: $x=-5$

Horizontal Asymptote: $y=2$

Slant Asymptote: n/a

Holes: $(-2,-4/3)$

x-int: $(0,0)$

$2x=0$

y-int: $(0,0)$

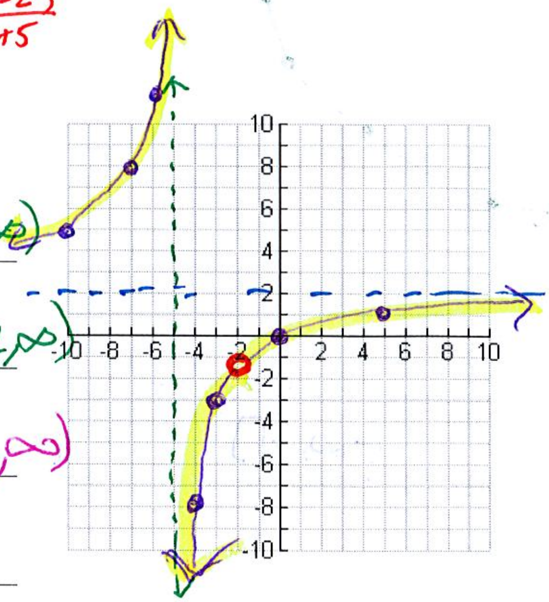
$\frac{0}{5}$

Domain: $(-\infty,-5)(-5,-2)(-2,\infty)$

Range: $(-\infty,-4/3)(-4/3,2)(2,\infty)$

INC: $(-\infty,-5)(-5,-2)(-2,\infty)$

DEC: n/a



10. $f(x)=\dfrac{x^2+x-6}{x-2}$ $=\dfrac{(x+3)\cancel{(x-2)}}{\cancel{x-2}}$ $\boxed{y=x+3}$ ← Line!! hole: $y=2+3$, $y=5$

Vertical Asymptote: n/a

Horizontal Asymptote: n/a

Slant Asymptote: n/a

Holes: $(2,5)$

x-int: $(-3,0)$

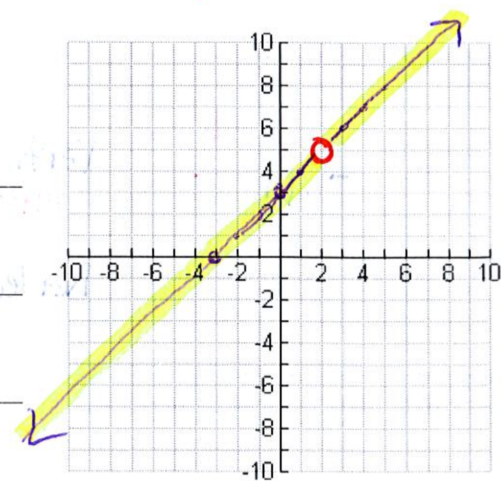
y-int: $(0,3)$

Domain: $(-\infty,2)(2,\infty)$

Range: $(-\infty,5)(5,\infty)$

INC: $(-\infty,2)(2,\infty)$

DEC: n/a



11. Can rational functions have Horizontal Asymptotes and Slant Asymptotes? No!

12. Can rational functions have Horizontal Asymptotes and Vertical Asymptotes? Yes!

13. $f(x) = \dfrac{x^2 - x - 20}{x^2 - 9}$  $\dfrac{(x-5)(x+4)}{(x+3)(x-3)}$

Vertical Asymptote: $x = 3, -3$

Horizontal Asymptote: $y = 1$

Slant Asymptote: n/a

Holes: n/a

x-int: $(5,0)(-4,0)$

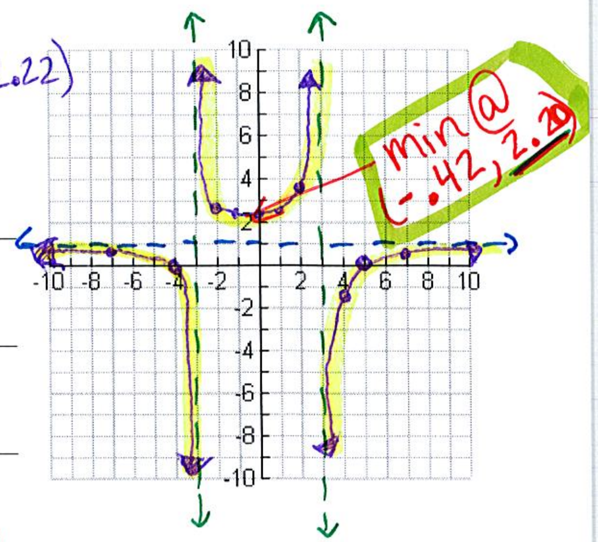
y-int: $(0, 20/9)$ or $(0, 2.22)$

Domain: $(-\infty,-3)(-3,3)(3,\infty)$

Range: $(-\infty,1)\ [2.20,\infty)$ ← y min!

INC: $(-.42, 3)(3,\infty)$

DEC: $(-\infty,-3)(-3,-.42)$




14. Find all the Asymptotes of $g(x) = \dfrac{x^2 - 2x + 5}{x + 2}$

$$\begin{array}{r|rrr} -2 & 1 & -2 & 5 \\ & \downarrow & -2 & -8 \\ \hline & 1 & -4 & \cancel{\ } \end{array}$$

(doesn't factor)

VA: $x = -2$

HA: none

Slant: $y = x - 4$

15. What is the x-intercept and y-intercept for $h(x) = \dfrac{x-3}{(x+1)(x-2)}$

$\dfrac{x-3}{x^2 - x - 2}$

x-int: $(3,0)$

y-int: $(0, 3/2)$

16. Write the equation of a rational function with vertical asymptotes of x = 1, x = -2/3 and a y-intercept of (0, 3)

Constants reduce to 3.

$f(x) = \dfrac{x^2 + x - 6}{(x-1)(3x+2)}$

**Solve each inequality algebraically. Write in interval notation.**

17. $\dfrac{6}{x+1} < -3$

Solve: (open) $6 = -3(x+1)$, $6 = -3x - 3$, $-3 = x$

Denomin: (open) $x + 1 = 0$, $x = -1$

-3 -1

Test "0": $\frac{6}{1} < -3$

$(-3, -1)$

18. $\dfrac{x+6}{x-2} \geq 0$

Solve: (closed) $x + 6 = 0(x-2)$, $x + 6 = 0$, $x = -6$

Denomin: (open) $x - 2 = 0$, $x = 2$

-6 0 2

Test "0": $\frac{0+6}{0-2} \geq 0$, $-3 \geq 0$ no!

$(-\infty, -6]\ (2, \infty)$