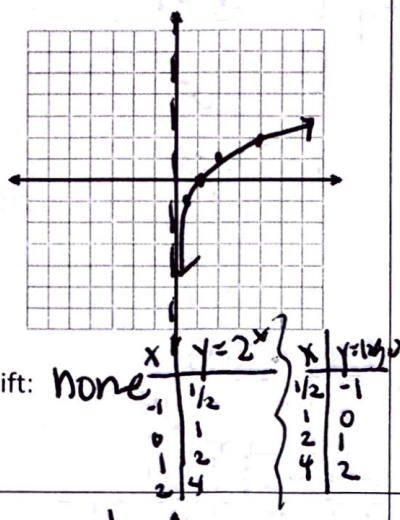
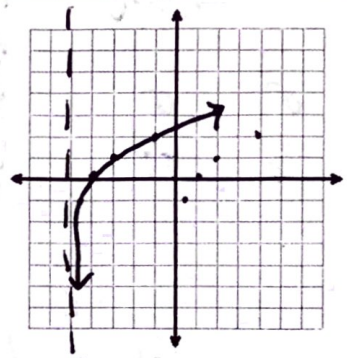
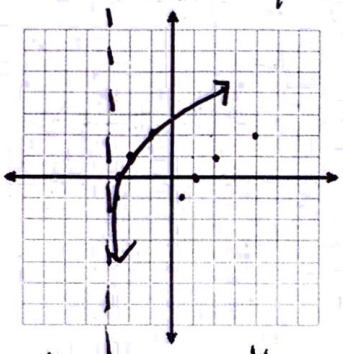
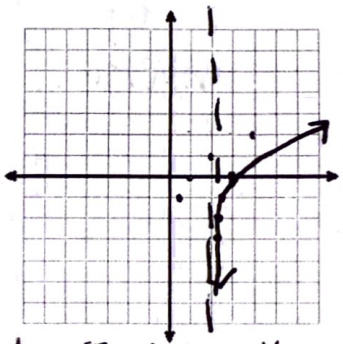
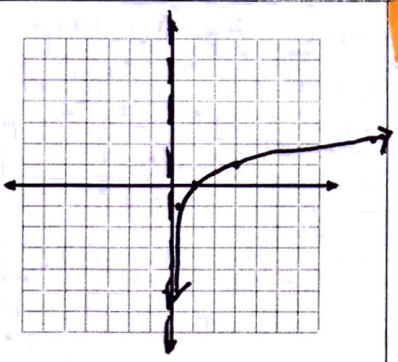
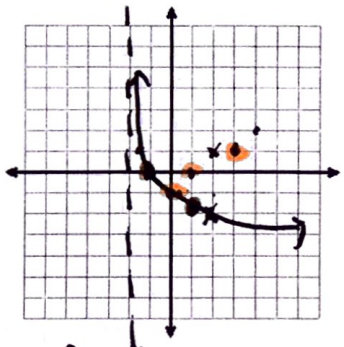
Log Graphing
Honors Math 3

Name: McG Key
Pd: _____ Date: _____

Equation	Sketch	Equation	Sketch
1) $y = \log_2 x$ D: $\{x \mid x > 0\}$ R: $\{y \mid y \in \mathbb{R}\}$ Asymptote: $x = 0$ End Behavior: $x \to \infty$, $y \to \infty$ $x \to 0$, $y \to -\infty$	 Shift: none $y = 2^x$: x: $-1, 0, 1, 2$; y: $\frac{1}{2}, 1, 2, 4$ $y = \log_2 x$: x: $\frac{1}{2}, 1, 2, 4$; y: $-1, 0, 1, 2$	2) $y = \log_2(x + 5)$ D: $\{x \mid x > -5\}$ R: $\{y \mid y \in \mathbb{R}\}$ Asymptote: $x = -5$ End Behavior: $x \to \infty$, $y \to \infty$ $x \to -5$, $y \to -\infty$	 Shift: left 5
3) $y = \log_2(2x + 6)$ D: $\{x \mid x > -3\}$ R: $\{y \mid y \in \mathbb{R}\}$ Asymptote: $x = -3$ End Behavior: $x \to \infty$, $y \to \infty$ $x \to -3$, $y \to -\infty$	 Shift: horiz. comp. $\frac{1}{2}$ left 3	4) $y = \log_2(4x - 8) - 2$ D: $\{x \mid x > 2\}$ R: $\{y \mid y \in \mathbb{R}\}$ Asymptote: $x = 2$ End Behavior: $x \to \infty$, $y \to \infty$ $x \to 2$, $y \to -\infty$	 Shift: horiz. comp. $\frac{1}{4}$ right 2 down 2
5) $y = \log_3 x$ D: $\{x \mid x > 0\}$ R: $\{y \mid y \in \mathbb{R}\}$ Asymptote: $x = 0$ End Behavior: $x \to \infty$, $y \to \infty$ $x \to 0$, $y \to -\infty$	 Shift: none	6) $y = -\log_3(x + 2)$ D: $\{x \mid x > -2\}$ R: $\{y \mid y \in \mathbb{R}\}$ Asymptote: $x = -2$ End Behavior: $x \to \infty$, $y \to -\infty$ $x \to -2$, $y \to \infty$	 Shift: reflect over x left 2

Continue →

$\log_3\left[\frac{1}{2}(x+6)\right]$

$\log_3[3(x-1)]-4$

7) $y = \log_3(\frac{1}{2}x + 3)$

D: $\{x \mid x > -6\}$

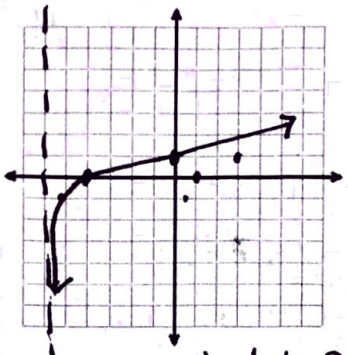
R: $\{y \mid y = \mathbb{R}\}$

Asymptote: $x = -6$

End Behavior:

$x \to \infty$, $y \to \infty$

$x \to -6$, $y \to -\infty$



Shift: horiz. stretch 2 left 6

8) $y = \log_3(3x - 3) - 4$

D: $\{x \mid x > 1\}$

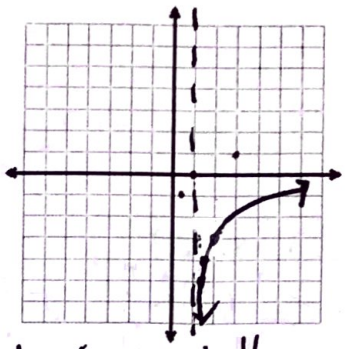
R: $\{y \mid y = \mathbb{R}\}$

Asymptote: $x = 1$

End Behavior:

$x \to \infty$, $y \to \infty$

$x \to 1$, $y \to -\infty$



Shift: horiz. comp. 1/3 right 1 down 4

Write equation of inverse.

$y = \frac{1}{2}\log_3(x-7)$

$2 \cdot x = 2 \cdot \frac{1}{2}\log_3(y-7)$

$2x = \log_3(y-7) = 2x$

$3^{2x} = y - 7$

$3^{2x} + 7 = y$

UNIT 2 DAY 3

Find $f^{-1}(x)$.

① $f(x) = \log_2(x+7)$

$y = \log_2(x+7)$

$x = \log_2(y+7)$ ← switch

$2^x = y+7$ ← exp form

$-7 \quad -7$

$\boxed{2^x - 7 = y}$

② $f(x) = 2\log_3 x - 4$

$y = 2\log_3 x - 4$

$x = 2\log_3 y - 4$

$+4 \qquad +4$

$\frac{x+4}{2} = \frac{2\log_3 y}{2}$

$\log_3 y = \frac{x+4}{2}$

$y = 3^{\frac{x+4}{2}}$

③ $f(x) = 2^{x+5} - 3$

$x = 2^{y+5} - 3$ isolate base exp.

$+3 \qquad +3$

$x+3 = 2^{y+5}$ ← log form!

$\log_2(x+3) = y+5$

$\log_2(x+3) - 5 = y$

④ $f(x) = \left(\frac{1}{3}\right)^{\frac{x}{4}}$

$y = \left(\frac{1}{3}\right)^{\frac{x}{4}}$

$x = \left(\frac{1}{3}\right)^{\frac{y}{4}}$ ← log form

$4 \cdot \log_{\frac{1}{3}} x = \frac{y}{4} \cdot 4$

$4 \cdot \log_{\frac{1}{3}} x = y$

WARMUP

Solve.

① $2^{-r} \cdot 2^{2r+3} = \frac{1}{16}$

② $4^{-2n} \cdot 4^{-3n} = \left(\frac{1}{8}\right)^{-2n}$

③ $\log_{\sqrt{x}} 125 = 3$

④ $\log_{\frac{1}{16}} x = -\frac{3}{2}$

1- $r = -7$
2- $n = 0$
3- $x = 25$
4- $x = 64$