Station #1

1. $y = \log(x+4) - 3$

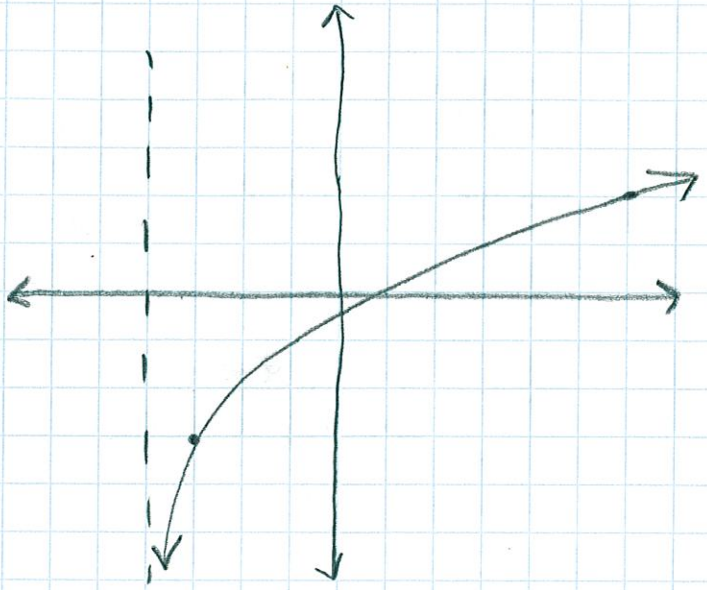
Transformations: L4, D3

Domain: $(-4, \infty)$

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

VA: $x = -4$

EB: $y \to -\infty,\ x \to -4$
$y \to \infty,\ x \to \infty$



2. $y = \frac{1}{2}\log x + 2$

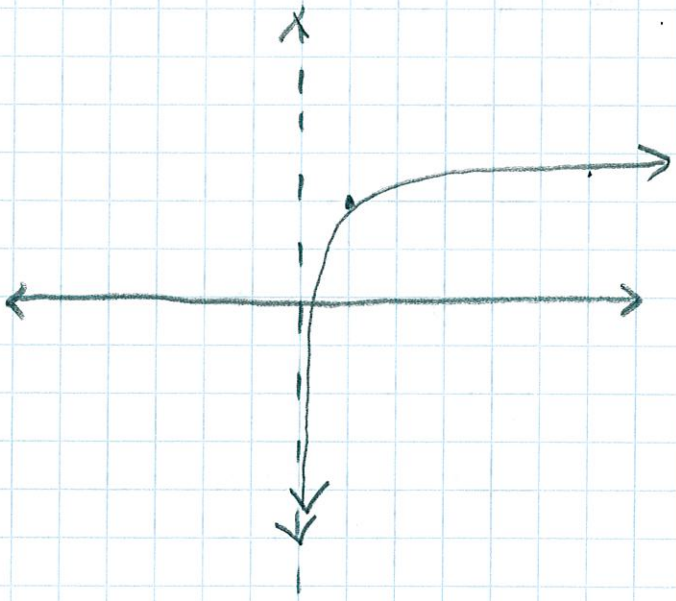
Transformations: Compression, U2

Domain: $(0, \infty)$

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

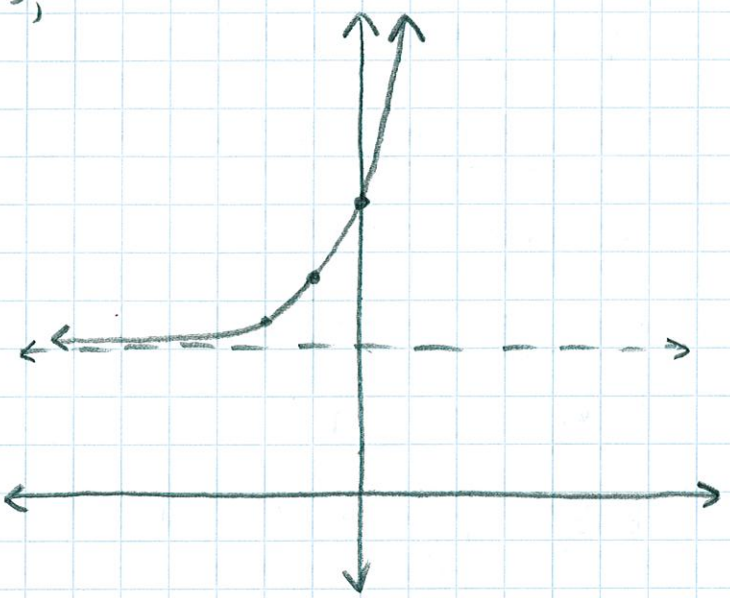
VA: $x = 0$

EB: $y \to -\infty,\ x \to 0$
$y \to \infty,\ x \to \infty$



3. $y = 3(2)^x + 3$

Transformations: stretch by 3, up 3



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

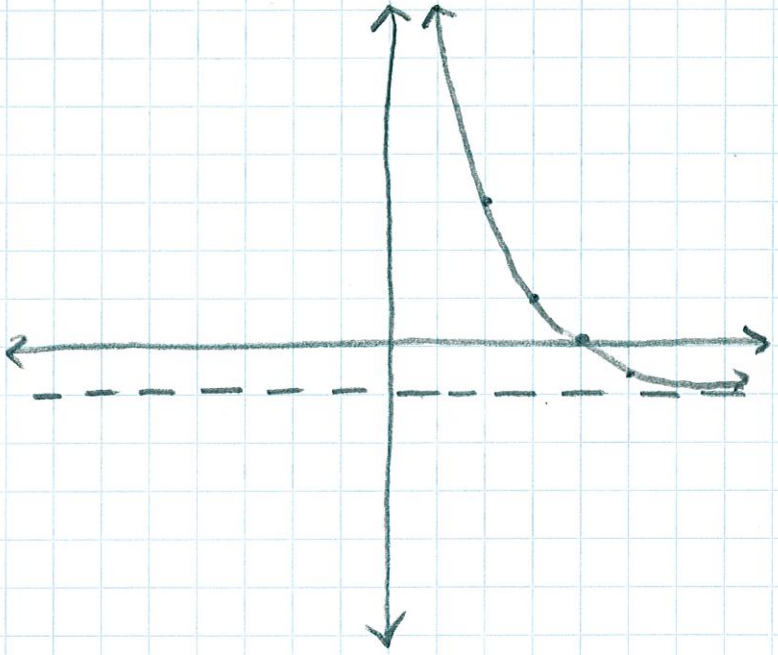
Range: $(3, \infty)$

HA: $y = 3$

EB: $y \to 3,\ x \to -\infty$
$y \to \infty,\ x \to \infty$

4. $y = \left(\frac{1}{2}\right)^{x-4} - 1$

Transformations: R4, D1



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

Range: $(-1, \infty)$

HA: $y = -1$

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

Station #2

1. $y = Pe^{rt}$

$P = 6000$

$r = 0.04$

$t = ?$

$y = 8000$

$8000 = 6000e^{0.04t}$

$\frac{4}{3} = e^{0.04t}$

$\ln \frac{4}{3} = \ln e^{0.04t}$

$\ln \frac{4}{3} = 0.04t$

$t = 7.19 \text{ yrs}$

2. $y = a(0.5)^{\frac{\text{time}}{HL}}$

$HL = 14.3$

$a = 100 \text{ mg}$

$t = 92$

$y = 100(0.5)^{\frac{92}{14.3}}$

$y = 1.157 \text{ mg} \approx 1 \text{ mg}$

3. $y = a\left(1 - \frac{r}{n}\right)^{nt}$

$y = 35800\left(1 - \frac{0.105}{1}\right)^{3(1)}$

a) $y = \$25665.64$

b) $12000 = 35800(1 - 0.105)^{t}$

$0.3352 = (0.895)^{t}$

$\log 0.3352 = t \log 0.895$

$t = \frac{\log 0.3352}{\log 0.895}$

$t = 9.85$

Station #3

1. $\log_2 128 = \frac{\log 128}{\log 2} = 7$

2. $\log_7 7^6 = 6$

3. $\log_4 12 = \frac{\log 12}{\log 4} = 1.7925$

4. $\log_4 256 = 4 \Rightarrow 4^4 = 256$

5. $\log_2 32 = 5 \Rightarrow 2^5 = 32$

6. $\log_2 N = t$

   $\log_2 64 = t$

   $\frac{\log 64}{\log 2} = t$

   $t = 6$ hours

Station #4

1. $\log 4 + \log 3 - 2\log x$

$\log \frac{(4)(3)}{x^2}$

$\log \frac{12}{x^2}$

2. $\frac{1}{3}(\log x - \log y)$

$\log x^{1/3} - \log y^{1/3}$

$\log \frac{x^{1/3}}{y^{1/3}}$

3. $\log y - 4(\log r + 2\log t)$

$\log y - (4\log r + 8\log t)$

$\log \frac{y}{r^4 t^8}$

4. $\log 3x^2 y$

$\log 3 + 2\log x + \log y$

5. $\log \sqrt{\frac{2x}{y}} = \log \left(\frac{2x}{y}\right)^{\frac{1}{2}}$

$\frac{1}{2}(\log 2 + \log x - \log y)$

or

$\frac{1}{2}\log 2 + \frac{1}{2}\log x - \frac{1}{2}\log y$

6. $\frac{1}{2}\log_4 4x = \log_4 2x$

$\log_4 (4x)^{\frac{1}{2}} = \log_4 2x$

$\log_4 4^{\frac{1}{2}} x^{\frac{1}{2}} = \log_4 2x$

$\log_4 2x^{\frac{1}{2}} \neq \log_4 2x$

False.

Station #5

1. $3^{x+5} - 5 = 15$

$3^{x+5} = 20$

$(x+5)\log 3 = \log 20$

$x+5 = \frac{\log 20}{\log 3}$

$x+5 = 2.7268$

$x = -2.2732$

2. $9^{2x} = 27$

$3^{2(2x)} = 3^3$

$4x = 3$

$x = 3/4$

3. $4\log x = 4$

$\log x = 1$

$10^1 = x$

$x = 10$

4. $2\log 3x - \log 9 = 1$

$\log \frac{(3x)^2}{9} = 1$

$10^1 = \frac{9x^2}{9}$

$90 = 9x^2$

$10 = x^2$

$x = \sqrt{10}$

5. $\log(3x^2) = \log(4x+32)$

$3x^2 = 4x + 32$

$3x^2 - 4x - 32 = 0$

-96 : -12, 8 : -4

$(3x^2 - 12x)(+8x - 32) = 0$

$3x(x-4)\,8(x-4) = 0$

$3x + 8 = 0$ $\quad x - 4 = 0$

$x = -\frac{8}{3}$ $\quad x = 4$

Both solutions work!

Station #6

1. $\ln e^{x+5} = 17$

$x+5 = 17$

$x = 12$

2. $e^{\ln x} = 21$

$x = 21$

3. $e^{x+6} + 5 = 1$

$e^{x+6} = -4$

$\ln e^{x+6} = \ln -4$

NO solution

4. $5\ln(4x-6) = 6$

$\ln(4x-6) = -1.2$

$e^{\ln}(4x-6) = e^{-1.2}$

$4x-6 = e^{-1.2}$

$4x = e^{-1.2} + 6$

$x = \frac{e^{-1.2}+6}{4}$

$x = 1.5753$

5. $3\ln 5 - \ln 2$

$\ln 5^3 - \ln 2$

$\ln 125 - \ln 2$

$\ln \frac{125}{2}$

6. $\frac{\ln e^2}{2} = \frac{2}{2} = 1$