Exponential & Log Func. Review

No Calculator

#1 + #8 (Graphs)

1(c)

$$\left(25^{-1/2} + 2^{-2}\right)^{-1}$$

$$\left(\frac{1}{\sqrt{25}} + \frac{1}{2^2}\right)^{-1}$$

$$\left(\frac{1}{5} + \frac{1}{4}\right)^{-1}$$

$$\left(\frac{4}{20} + \frac{5}{20}\right)^{-1}$$

$$\left(\frac{9}{20}\right)^{-1}$$

$$= \frac{20}{9}$$

1) Common bases
2) Log + Plog
3) Exponentiate

$$\log_2 \frac{1}{16} = \log_2 2^{-4} = -4$$

d-i) Common bases

$$e^{3\ln 5} = e^{\ln 5^3} = 125$$

$y = 2^{-(x-3)} - 1$

Right 3 Down 1

x	y
0	1
−1	2
−2	4
−3	8

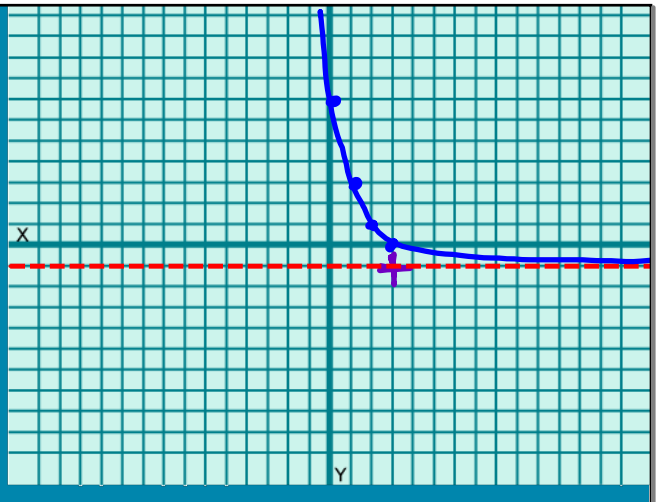
Exp

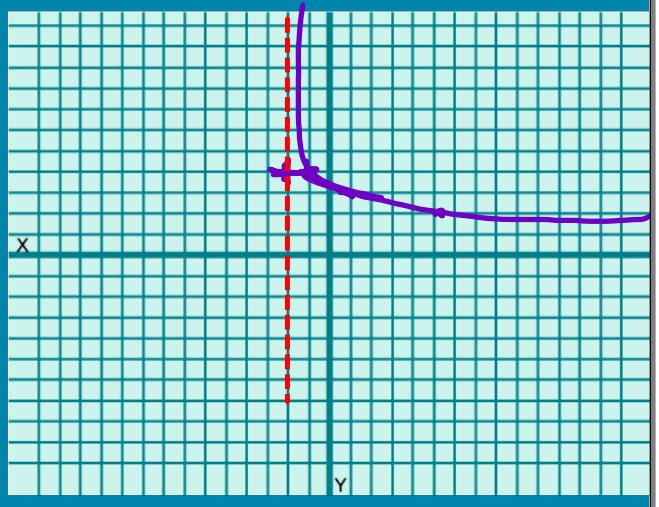
log

$y = -\ln_e(x+2) + 4$

left 2 up 4

1	0
2.7	−1
7.4	−2





#3 Solve.

$\log_b m + \log_b n = \log_b mn$

$\log_b m - \log_b n = \log_b \left(\frac{m}{n}\right)$

$\log_b m^p = p \cdot \log_b m$

Like 3c

$\log_{49} \frac{1}{7} = x$

$49^{\log_{49} \frac{1}{7}} = 49^x$

$\frac{1}{7} = 49^x$

$7^{-1} = 7^{2x}$

$-1 = 2x$

$-\frac{1}{2} = x$

3(d)

$2\log_6 4 - \frac{1}{3}\log_6 8 = 3\log_6 x$

$\log_6 16 - \log_6 2 = \log_6 x^3$

$\log_6 \frac{16}{2} = \log_6 x^3$

$\log_6 8 = \log_6 x^3$

$8 = x^3$

$\boxed{2 = x}$

Like 3i

$\ln x + \ln(x-4) = 8$

$e^{\ln(x^2-4x)} = e^8$

$x^2 - 4x = e^8$

$x^2 - 4x - e^8 = 0$

$x = \frac{4 \pm \sqrt{16 - 4(1)(-e^8)}}{2(1)}$

$\frac{4 \pm \sqrt{16 + 4e^8}}{2}$

3j

$7^{x+3} = 3^{5-x}$ Log & plog!

$(x+3)\log 7 = (5-x)\log 3$

$x\log 7 + 3\log 7 = 5\log 3 - x\log 3$

$x\log 7 + x\log 3 = 5\log 3 - 3\log 7$

$x(\log 7 + \log 3) = 5\log 3 - 3\log 7$

$$x = \frac{5\log 3 - 3\log 7}{\log 7 + \log 3}$$

Like 3m

$e^{2x} - 3e^{x} = 10$

$e^{2x} - 3e^{x} - 10 = 0$

$(e^{x} - 5)(e^{x} + 2) = 0$

An energy drink contains 200 mg of caffeine. If the half-life of caffeine in the body is 6 hours, In how many hours will there be 150 mg of caffeine remaining?

$$N = N_0 e^{kt}$$

$$\frac{100}{200} = \frac{200 e^{k \cdot 6}}{200}$$

$$0.5 = e^{6k}$$

$$\ln(0.5) = \ln e^{6k}$$

$$\frac{\ln(0.5)}{6} = 6k$$

$$-0.116 = k$$

$$\frac{175}{200} = \frac{200 e^{-0.116t}}{200}$$

$$\ln\left(\frac{7}{8}\right) = \ln\left(e^{-0.116t}\right)$$

$$\frac{\ln\left(\frac{7}{8}\right)}{-0.116} = \frac{-0.116t}{-0.116}$$

$$1.15 \text{ hrs} = t$$