Review

1) $5^{-1.3} = \boxed{.123}$ (calculator)

2) $e^{3.5}$ 33.115 (calculator)

3) $3^x = 243$

$3^x = 3^5$

$\boxed{x = 5}$

(4) $9^{5x} = 3.9$

$\ln 9^{5x} = \ln 3.9$

power rule

$\frac{5x(\ln 9)}{5 \ln 9} = \frac{\ln 3.9}{5 \ln 9}$

(in calculator)

$x = \frac{\ln 3.9}{5 \ln 9} = \boxed{.12}$

5) $e^{x+7} = 2$

$\ln e^{x+7} = \ln 2$

$x + 7(\ln e) = \ln 2 \quad (\ln e = 1)$

$x + 7 = \ln 2$

$x = (\ln 2) - 7$

$\approx \boxed{-6.31}$

6) $\frac{6 \ln(7x)}{6} = \frac{36}{6}$

$\ln(7x) = 6$

$\log_e(7x) = 6$

$e^6 = 7x$

$x = \frac{e^6}{7} = \boxed{57.63}$

(7) $\log_6(4x - 1) = 3$

$6^3 = 4x - 1$

$216 = 4x - 1$

$217 = 4x$

$\frac{217}{4} = x$

$\boxed{54.25 = x}$

8) $\frac{400e^{.005x}}{400} = \frac{1600}{400}$

$e^{.005x} = 4$

$\ln e^{.005x} = \ln 4$ (power rule)

$.005x(\ln e) = \ln 4$ $\quad \ln e = 1$

$.005x = \ln 4$

$x = \frac{\ln 4}{.005} \approx \boxed{277.26}$

9) $27^{x-2} = 9^{2x-4}$

$3^{3(x-2)} = 3^{2(2x-4)}$

$3(x-2) = 2(2x-4)$

$3x - 6 = 4x - 8$

$-3x \quad -3x$

$-6 = x - 8$

$+8 \quad +8$

$\boxed{2 = x}$

10) $6^x = 55$

$\ln 6^x = \ln 55$

$x(\ln 6) = \ln 55$

$x = \frac{\ln 55}{\ln 6}$

$\approx \boxed{2.24}$

11) $f(6) = 183e^{.043(6)}$

$= 183$ in calc

$= \boxed{237 \text{ beavers}}$

12) $f(206) = 1 + 1.5\ln(207)$

$= \boxed{9 \text{ consecutive free throws}}$

13) $A = P(1+r)^t$

$A = 1270(1+.05)^{11}$

$= \boxed{\$2172.13}$

$\frac{\ln 2}{2\ln(1.035)} = t$

$= \boxed{10.1 \text{ yrs}}$

14) $\frac{5600}{2800} = \frac{2800}{2800}\left(1 + \frac{.07}{2}\right)^{2t}$

$2 = (1.035)^{2t}$

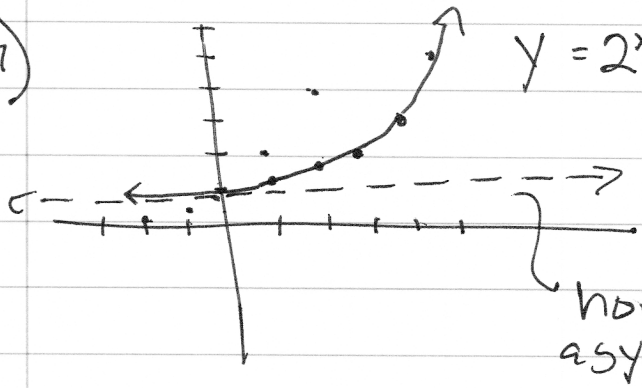
$\ln 2 = \ln(1.035)^{2t}$

$\frac{\ln 2}{2\ln(1.035)} = \frac{2t\ln(1.035)}{2\ln(1.035)}$

15) $\frac{70}{6.3} \approx$ **11.1 yrs** to double

16) $A = 8{,}200\,e^{.048(12)} \approx$ **\$14587.05**

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

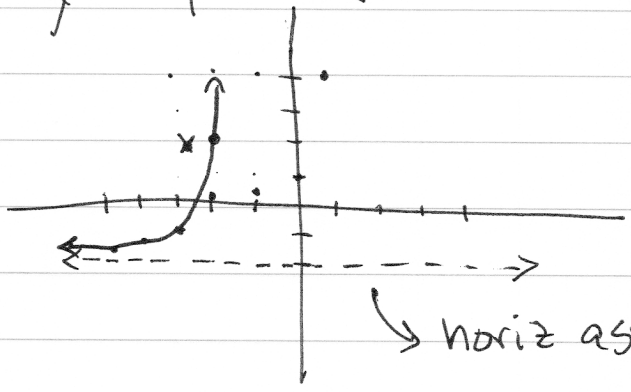


$y = 2^x$ shifted right 3 and up 1

horiz asy **$y = 1$**

Dom $(-\infty, \infty)$
Range $(1, \infty)$

18) $y = 4^{x+3} - 2$



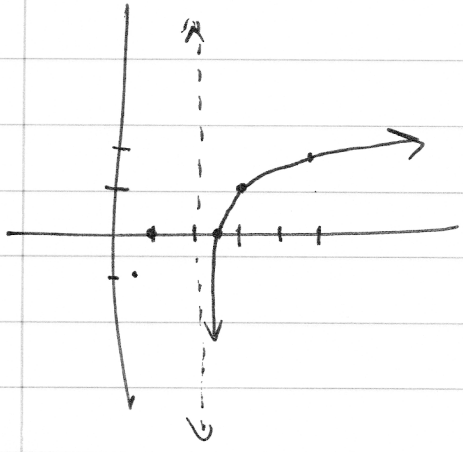
$y = 4^x$ shifted left 3 and down 2

horiz asy **$y = -2$**

Dom $(-\infty, \infty)$
Range $(-2, \infty)$

19) $y = \log_3(x-2) + 1$

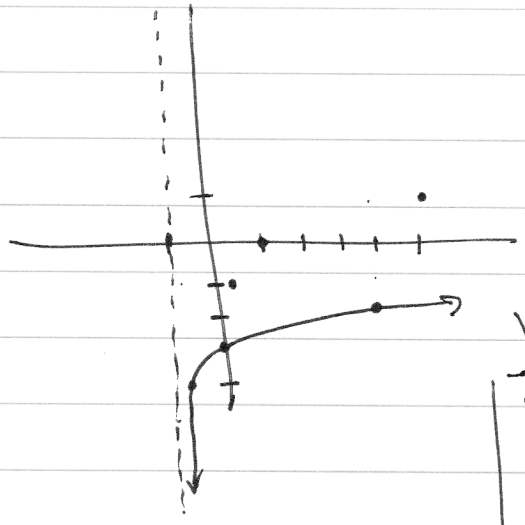
$y = \log_3 x$ shifted right 2 and up 1



vertical asy $x = 2$
Domain $(2, \infty)$
Range $(-\infty, \infty)$

20) $y = \log_5(x+1) - 3$

$y = \log_5 x$ shifted left 1 and down 3



vert asy = $x = -1$

Domain $(-1, \infty)$
Range $(-\infty, \infty)$

21) $\log_b 81 = 4 \Rightarrow b^4 = 81$

22) $\log_4 16 = 2 \Rightarrow 4^2 = 16$

23) $6^2 = 36 \Rightarrow \log_6 36 = 2$

24) $\sqrt[3]{8} = 2$
$8^{1/3} = 2$
$\log_8 2 = \frac{1}{3}$

25) $\log 1000 =$
$\log_{10} 1000 = 3$

26) $\log_9 \sqrt{9} = \log_9 9^{1/2} = \frac{1}{2}\log_9 9 = \frac{1}{2}(1) = \frac{1}{2}$

27) $\log_{12} 1 = 0$

(28) $\log_4 \frac{1}{16} = \log_4 \frac{1}{4^2} = \log_4 4^{-2}$
$= -2 \cdot \log_4 4 = -2 \cdot 1 = -2$

(29) $8^{\log_8 15} = 15$

(30) $\ln e^{3.4} =$
$3.4(\ln e) = 3.4$

$\ln e = 1$