18.) $f(x) = \frac{3x-27}{x^2+3}$ NO V.A. or S.A

H.A @ $y=0$

19.) $-(64)^{\frac{2}{3}} =$

$= -(\sqrt[3]{64})^3 = -8^3 =$ **-512**

20.) $\frac{1}{(\sqrt[5]{243})^4} = \frac{1}{(3)^4} =$ **$\frac{1}{81}$**

21.) $-(32)^{\frac{3}{5}}$

$-(\sqrt[5]{32})^3 =$ **-8**

22.) $\sqrt[3]{(-2)^6}$

$= (-2)^2$

$=$ **4**

Make the Bases the same (#23-26)

23.) $4^{2x} = 16^{3x-2}$

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

$2x = 6x - 4$

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

$x = 1$

24.) $36^x = \sqrt{6}$

$(6^2)^x = 6^{\frac{1}{2}}$

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

$x = \frac{1}{4}$

25.) $\left(\frac{1}{81}\right)^x = 3^{5x+4}$

$(3^{-4})^x = 3^{5x+4}$

$-4x = 5x + 4$

$\frac{-9x}{-9} = \frac{4}{-9}$

$x = -\frac{4}{9}$

24. $72 = 2x^4$

$36 = x^4$

$(36)^{1/4} = (x^4)^{1/4}$

$6^{4/4} \Leftarrow (6^2)^{1/4} = x$

$\boxed{\sqrt{6} \text{ or } 6^{1/2} = x}$

25) $\log_{36} x = -\frac{3}{2}$

$36^{-\frac{3}{2}} = x = \frac{1}{216}$

$\boxed{.005 = x}$

26) $\log x = -4.15$

$10^{-4.15} = x$

$\boxed{7.08}$

27) $\log_4 4^{3x+5} = \log 25$

$(3x+5)\log 4 = \log 25$

$\frac{3x+5}{3} = \frac{\log 25}{\log 4} - 5 \div 3$

$\frac{3x}{3} = \frac{\log 25}{\log 4} - 5$

$\boxed{x = -.89}$

28) $4e^{2x+3} - 1 = 15$

$\frac{4e^{2x+3}}{4} = \frac{16}{4}$

$\ln e^{2x+3} = \ln 4$

$\frac{2x+3}{2} = \ln 4 - 3 \div 2$

$\frac{2x}{2} = \ln 4 - 3$

$\boxed{x = -.81}$

30) $\ln 2 = \ln e^{.07t}$

$\frac{\ln 2}{.07} = \frac{.07t}{.07}$

$\boxed{t = 9.90 \text{ yrs}}$

31) $V = V_0(1-r)^t$

$2000 = 15{,}000(1-.22)^t$

$\frac{2000}{15{,}000} = (1-.22)^t$

$\log \frac{2}{15} = \log(1-.22)^t$ $\quad 1-.22 = .78$

$\log \frac{2}{15} = t \log(.78)$

$\frac{\log(\frac{2}{15})}{\log(.78)} = t$ $\quad t > 8.11$ years

26) $4^{x-2} = \frac{1}{128}$

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

$2^{2x-4} = 2^{-7}$

$2x-4 = -7$

$2x = -3$

$\boxed{x = \frac{-3}{2}}$

A, B, F, G, H are Exponential Functions

C, D, E are log Functions

27) D Decreasing log

28) B Reflected Expon

29) A Decreasing Expon

30) G Increasing Expon (1,4)

31) G Same as 30. Neg Expon flips y=4 to 4

32) H up 1

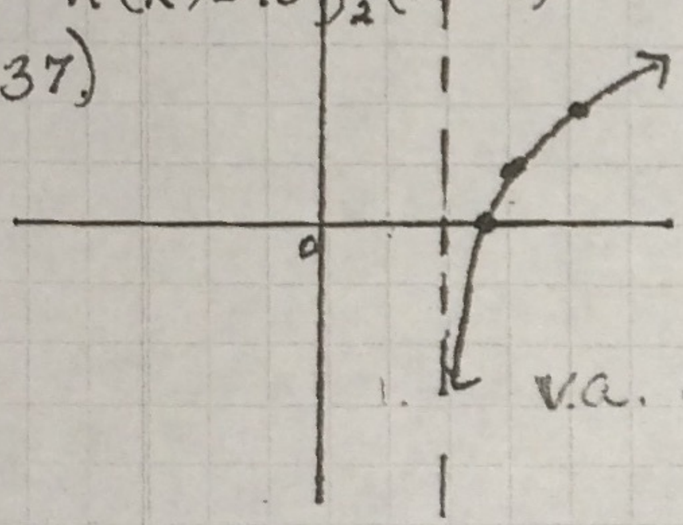
33) C Left 1

34.) E Parent function (1,0)

35) F Left 1

36) E $y = \log_4 x$

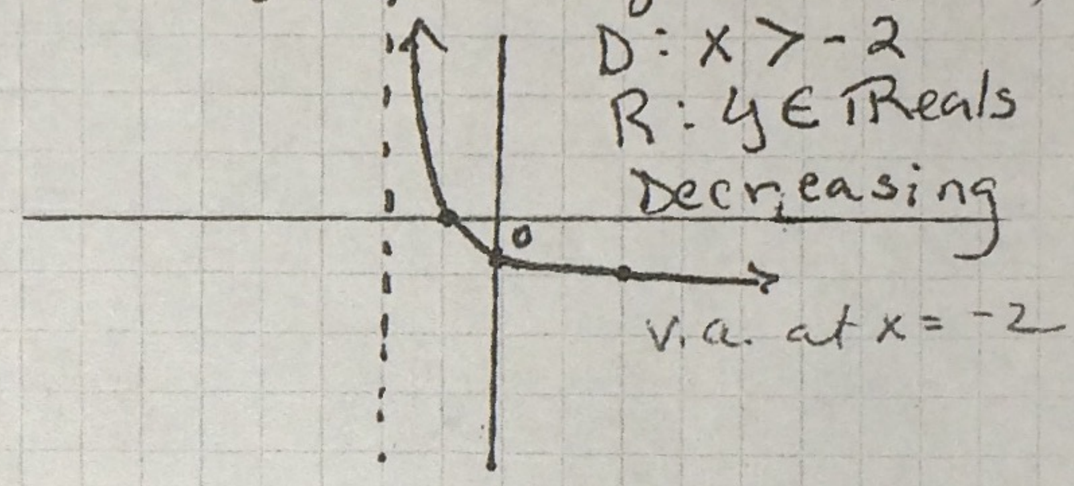
37) $h(x) = \log_2(x-2)+1$



38) $y = -\log_4(x+2)$

x-int (-1,0)

y-int (0, -½)



39) $5^2 = 25$

$\boxed{\log_5 25 = 2}$

40) $e^{-.56} = .715$

$\boxed{\ln .715 = -.56}$

41) $x^3 = 15$

$\boxed{\log_x 15 = 3}$

42) $\log_5 \frac{1}{25} = -2$

$\boxed{5^{-2} = \frac{1}{25}}$

43) $\log 7 \approx .903$

$\boxed{10^{.903} = 7}$

44) $\ln x = \frac{1}{5}$

$\boxed{e^{\frac{1}{5}} = x}$

45) $\log 0.001 = x$

$10^x = .001$

$\boxed{x = -3}$

46) $\log_{\sqrt{3}} \frac{1}{9} = x$

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

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

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

$\boxed{x = -4}$

47) $\log_8 2 = x$

$8^x = 2$

$(2^3)^x = 2^1$

$\frac{3}{3}x = \frac{1}{3}$

$\boxed{x = \frac{1}{3}}$