wksht 17 solns

1. a $\log_4 2 = \square$

$4^{\square} = 2$

$2^{2\square} = 2^1$

$\square = (1/2)$

b. $\log_{\frac{1}{9}} 27 = x$

$(\frac{1}{9})^x = 27$

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

$x = (-3/2)$

c. $\ln e^7$

$\log_e e^7 = x$

$e^x = e^7$

$x = (7)$

d. $\log_2 4^5 = x$

$2^x = (2^2)^5$

$x = (10)$

e. $7^{\log_7 1}$

$= 7^0$

$= (1)$

2. a. $\log_x 64 = 2$

$x^2 = 64$

$\boxed{x = 8}$

b. $\log_2 x = -2$

$2^{-2} = x$

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

c. $\log_5 x = 2$

$5^2 = x$

$\boxed{x = 25}$

d. $\log_e x = -1$

$e^{-1} = x$

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

e. $\log_x \frac{1}{\sqrt{6}} = \frac{1}{2}$

$x^{1/2} = \frac{1}{\sqrt{6}}$

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

$\boxed{x = \frac{1}{6}}$

f. $\log_x 8 = \frac{3}{2}$

$x^{3/2} = 8$

$\sqrt[3]{x^{3/2}} = \sqrt[3]{8}$

$(x^{1/2})^2 = (2)^2$

$\boxed{x = 4}$

a. domain: $-x > 0$

$x < 0$

$(-\infty, 0)$

VA: $x = 0$

x-int: $0 = \log_3(-x) + 3$

$-3 = \log_3(-x)$

$3^{-3} = -x$

$x = -\frac{1}{27}$

extra pt:

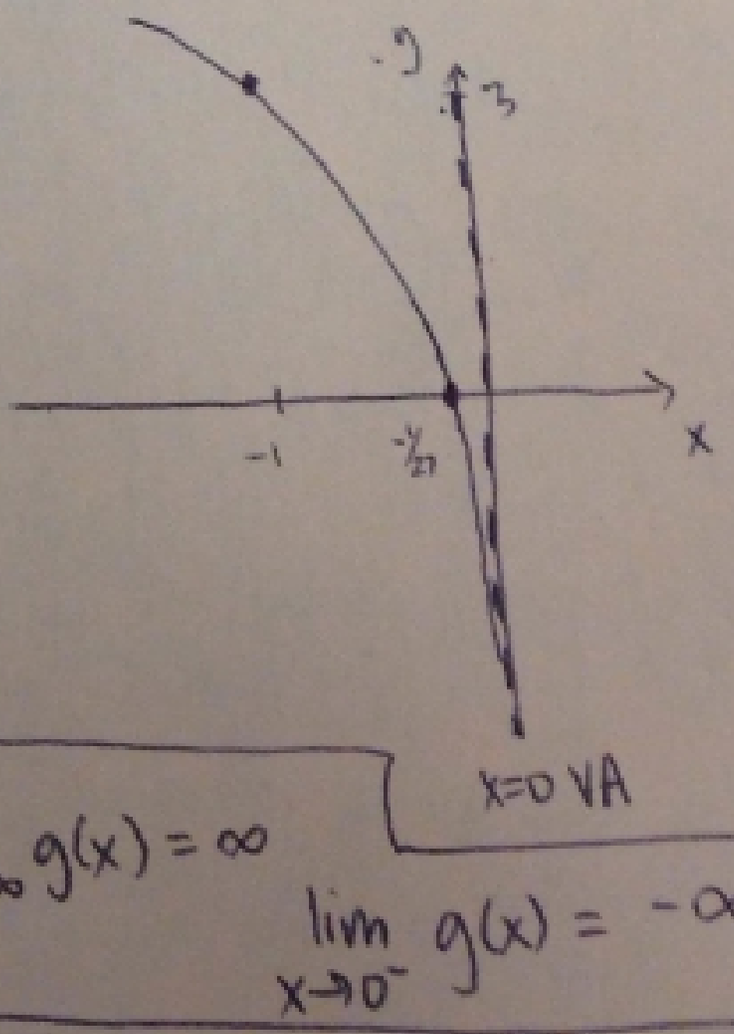
$x = -1$

$g(-1) = \log_3 1 + 3$

$= 0 + 3$

$= 3$

$(-1, 3)$ on graph



$\lim_{x \to -\infty} g(x) = \infty$

$\lim_{x \to 0^-} g(x) = -\infty$

3b. domain $x-2>0$

$x>2$

$(2,\infty)$

VA: $x=2$

x-int: $\frac{0}{-4} = \frac{-4\log_{\frac{1}{2}}(x-2)}{-4}$

$0 = \log_{\frac{1}{2}}(x-2)$

$\left(\frac{1}{2}\right)^0 = x-2$

$1 = x-2$

$+2 \quad +2$

$x = 3$

extrm pt:

$x=3$... already did

$x=4$

$h(4) = -4\log_{\frac{1}{2}}(4-2)$

$= -4\log_{\frac{1}{2}}(2)$

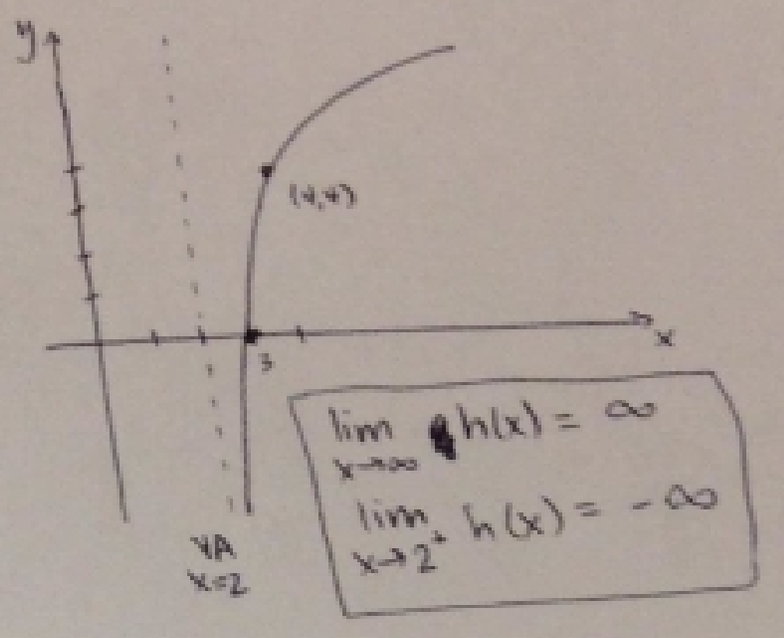
$\frac{1}{2}^{\square} = 2$

$\square = -1$

$= (-4)(-1)$

$= 4$

(4,4) on graph



$\lim_{x\to\infty} h(x) = \infty$

$\lim_{x\to 2^+} h(x) = -\infty$

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

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

$x = 3 + 2\underbrace{\ln\sqrt{e}}$

$e^? = e^{1/2}$

$\Rightarrow \ln\sqrt{e} = \frac{1}{2}$

$x = 3 + 2\left(\frac{1}{2}\right)$

$= 3+1$

$= \boxed{4}$

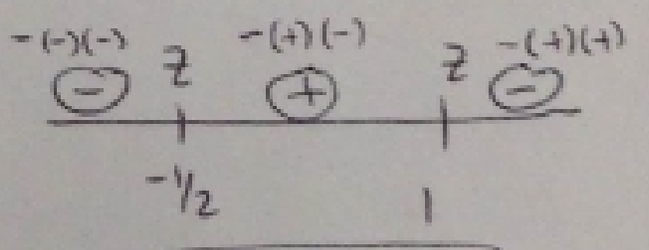
5. domain $\log_4(1+x-2x^2)$

$1+x-2x^2 > 0$

$-(2x^2-x-1) > 0$

$-(2x+1)(x-1) > 0$

sign chart: zeros $-1/2, 1$



so $\boxed{(-1/2, 1)}$

6. domain $-3x+1>0$

$-3x > -1$

$x < 1/3$

$(-\infty, 1/3)$ VA at $x = 1/3$

x-int: $0 = \frac{1}{2}\ln(-3x+1)$

$0 = \ln(-3x+1)$

$e^0 = -3x+1$

$x = 0$ pt (0,0) on graph

(so also = y-int)

another pt:

$k(-1)$?

$= \frac{1}{2}\underbrace{\ln 4}$

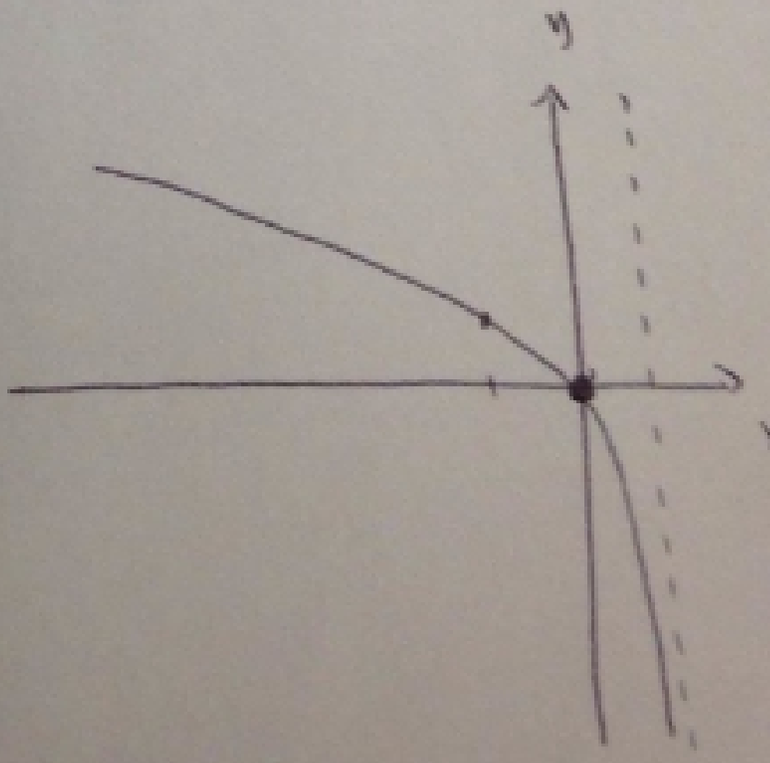
>0

so $k(-1) > 0$

$k(-100)$

$= \frac{1}{2}\ln 301$

>0



$\lim_{x\to-\infty} k(x) = \infty$ $\lim_{x\to 1/3^-} k(x) = -\infty$