

6.5 - 6.6 Review WS Key

1.) $\ln 4(16)$
 $\ln 64$
 ≈ 4.159

2.) $\frac{1}{2}^{\square} = 16$

-4 $\frac{(\log(16))}{(\log \frac{1}{2})}$

3.) $4^{\square} = 9$

$\frac{\log 9}{\log 4} \approx 1.585$

4.) $\ln(2x)5 = 10$
 $\log_e 10x = 10$
 $\frac{e}{10} = \frac{10x}{10}$

$2202.647 \approx x$

8.) $2^{x+4} = 20$

$(x+4) \frac{\log 2}{\log 2} = \frac{\log 20}{\log 2}$

$x+4 = 4.322$
 $-4 \quad -4$

$x = 0.322$

9.) $\log_4(x-1) = 3$

$4^3 = x-1$

out of order!

5.) $3^x = \frac{1}{27}$
 $3^x = 3^{-3}$

$x = -3$

6.) $49^{x+4} = 7^{x-6}$
 $(7^2)^{x+4} = 7^{x-6}$
 $7^{2x+8} = 7^{x-6}$

$2x+8 = x-6$
 $-2x+6 \quad -2x+6$

$14 = -x$

$-14 = x$

$$7.) \quad 13^{3x-1} = 91$$

$$\log 13^{3x-1} = \log 91$$

$$3x-1 \frac{\log 13}{\log 13} = \frac{\log 91}{\log 13}$$

$$3x-1 = 1.759$$

$$\frac{3x}{3} = \frac{2.759}{3}$$

$$x = 0.919$$

$$10.) \quad \log_2 X^{\frac{1}{3}} = 5$$

$$2^5 = X^{\frac{1}{3}}$$

$$[32]^3 = [X^{\frac{1}{3}}]^3$$

$$32,768 = X$$

$$2^5 = (32,768)^{\frac{1}{3}}$$

$$32 = 32$$

✓

$$11.) \quad \log_{16} x - \log_4 = 2$$

$$\log \frac{16x}{4} = 2$$

$$\log_{16} 4x = 2$$

$$10^2 = 4x$$

$$\frac{100}{4} = \frac{4x}{4}$$

$$25 = x$$

$$12.) \quad y = a \left(1 + \frac{r}{n}\right)^{nt}$$

$$2000 = 500 \left(1 + \frac{0.035}{4}\right)^{4t}$$

$$4 = (1.00875)^{4t}$$

$$\log 4 = \log (1.00875)^{4t}$$

$$\log 4 = 4t \log (1.00875)$$

$$\log 1.00875$$

$$\log 1.00875$$

$$159.126 = 4t$$

$$39.781 = t$$

yrs.

$$17.) \log(-4x) + \log(9) = \log 23 \quad \log$$

$$\log(-36x) = \log 23$$

$$-36x = 23$$

$$x = \frac{23}{-36}$$

$$18.) \log(x-10) - \log 8 = 1 \quad 23.) \ln(x-8) - \ln 3 = 4$$

$$\log_{10} \frac{x-10}{8} = 1$$

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

$$8 - 10^1 = \frac{x-10}{8} \cdot 8$$

$$3 \cdot e^4 = \frac{x-8}{3} \cdot 3$$

$$\begin{array}{r} 80 = x-10 \\ +10 \quad +10 \\ \hline \end{array}$$

$$\begin{array}{r} 3e^4 = x-8 \\ +8 \quad +8 \\ \hline \end{array}$$

$$90 = x$$

$$3e^4 + 8 = x$$

$$171.794 = x$$

$$24.) \ln 4 + \ln(2x) = 3$$

$$19.) \log(x+24) + \log x = \log 52$$

$$\ln 8x = 3$$

$$\log x(x+24) = \log 52$$

$$\frac{e^3}{8} = \frac{8x}{8}$$

$$\frac{-52}{20 \pm 2} = 24$$

$$x^2 + 24x = 52$$

$$x^2 + 24x - 52 = 0$$

$$(x-2)(x+26) = 0$$

$$2.511 \approx x$$

$$x = 2, -26$$

$$20.) \log 2 + \log(x^2 - 7) = \log 36$$

$$\log 2(x^2 - 7) = \log 36$$

$$2x^2 - 14 = 36$$

$$\begin{array}{r} +14 \quad +14 \\ \hline \end{array}$$

$$2x^2 = 50$$

$$x^2 = 25$$

$$x = 5, -5$$

$$21.) \ln(x+3) - \ln 6 = 2 \quad 22.) \ln(x+10) - \ln 5 = 2$$

$$\ln \frac{x+3}{6} = 2$$

$$\ln \frac{x+10}{5} = 2$$

$$6 \cdot e^2 = \frac{x+3}{6} \cdot 6$$

$$5 \cdot e^2 = \frac{x+10}{5} \cdot 5$$

$$\begin{array}{r} 6e^2 = x+3 \\ -3 \quad -3 \\ \hline \end{array}$$

$$\begin{array}{r} 5e^2 = x+10 \\ -10 \quad -10 \\ \hline \end{array}$$

$$6e^2 - 3 = x$$

$$41.334 = x$$

$$5e^2 - 10 = x$$

$$26.945 = x$$