

College Algebra

3.5 Day 3 Practice

Name: Key

Date: _____ Period: _____

Solve. If necessary, round to four decimal places. Don't forget to check your answers!

1) $20^{-6x} + 6 = 55$ *either log/Ln can be used*

$$20^{-6x} = 49$$

$$\ln 20^{-6x} = \ln 49$$

$$-6x \ln 20 = \ln 49$$

$$x = \frac{\ln 49}{-6 \ln 20}$$

$$\boxed{-2.165}$$

3) $6e^{5x-6} - 4 = 50$

$$6e^{5x-6} = 54$$

$$e^{5x-6} = 9$$

$$\ln e^{5x-6} = \ln 9$$

$$5x - 6 = \ln 9$$

$$5x = \ln 9 + 6$$

$$x = \frac{\ln 9 + 6}{5}$$

$$\boxed{x = 1.6394}$$

5) $\log_2 2x = -0.65$

$$2^{-0.65} = 2x$$

$$\frac{2^{-0.65}}{2} = x$$

$$\boxed{.3186 = x}$$

2) $\log_4 x + \log_4(10-x) = 2$

$$\log_4 x(10-x) = 2$$

$$4^2 = 10x - x^2$$

$$x^2 - 10x + 16 = 0$$

$$(x-8)(x-2) = 0$$

$$\boxed{x=8} \quad \boxed{x=2} \quad * \text{ don't forget to check!}$$

4) $\frac{1}{3} \log_2 x + 5 = 7$

$$\frac{1}{3} \log_2 x = 2$$

$$\log_2 x = 6$$

$$2^6 = x$$

$$\boxed{64 = x}$$

6) $2 \cdot 9^{x+10} + 3 = 81$

$$2 \cdot 9^{x+10} = 78$$

$$9^{x+10} = 39$$

$$\ln 9^{x+10} = \ln 39$$

$$(x+10) \ln 9 = \ln 39$$

$$x+10 = \frac{\ln 39}{\ln 9}$$

$$x = \frac{\ln 39}{\ln 9} - 10$$

$$\boxed{x = -8.3326}$$

$$7) \quad \ln 36 = \ln(x-1) - \ln(x+1)$$

$$\ln 36 = \ln \frac{x-1}{x+1}$$

$$36 = \frac{x-1}{x+1}$$

$$36(x+1) = x-1$$

$$36x + 36 = x - 1$$

$$35x = -37$$

$$x = \frac{-37}{35}$$

$$x = -1.0571$$

$$9) \quad \log_{81} 27 = x - 5$$

change of base

$$\frac{\log 27}{\log 81} = x - 5$$

$$\frac{\log 27}{\log 81} + 5 = x$$

$$5.75 = x$$

$$11) \quad 4 \log_5(x+1) = 4.8$$

$$\log_5(x+1) = 1.2$$

$$5^{1.2} = x+1$$

$$5^{1.2} - 1 = x$$

$$5.8986 = x$$

$$8) \quad \log 5x + \log(x-1) = 2$$

$$\log 5x(x-1) = 2$$

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

$$0 = 5x^2 - 5x - 100$$

$$0 = 5(x^2 - x - 20)$$

$$0 = 5(x+4)(x-5)$$

$$5 \neq 0 \quad x = -4 \quad x = 5$$

$$10) \quad 2 \log x + 5 \log 2 = 9$$

$$\log x^2 + \log 2^5 = 9$$

$$\log 32x^2 = 9$$

$$10^9 = 32x^2$$

$$\frac{10^9}{32} = x^2$$

$$\sqrt{\frac{10^9}{32}} = x$$

$$\pm 5590.1499 = x$$

$$x = 5590.1499$$

$$12) \quad \log_7(x^2+2) - \log_7 343 = \log_7 1$$

$$\log_7 \frac{x^2+2}{343} = \log_7 1$$

$$\frac{x^2+2}{343} = 1$$

$$x^2+2 = 343$$

$$x^2 = 341$$

$$x = \pm 18.4662$$