

Marco Work Friday Homework Quiz Week 11

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Friday

12.  $2\log_2(x+4) - \log_2 9 = 2$        $\log_a M^r = r(\log_a M)$   
 $\log_2 (x+4)^2 - \log_2 9 = 2$        $\log_a M - \log_a N = \log_a \frac{M}{N}$   
 $\log_2 \left( \frac{(x+4)^2}{9} \right) = 2$        $\log_a x = y \rightarrow a^y = x$

$3^2 = \frac{(x+4)^2}{9}$

$9 \cdot 9 = \frac{(x+4)^2}{9} \cdot 9$

$9^2 = (x+4)^2$

$9 = x+4$

$x = 5$  or  $x = -13$

$a^v = a^u \rightarrow v = u$

$-13 + 4 = 9$

19.  $3^{2x} + 3^{x+1} - 4 = 0$

$(3^x)^2 + 3 \cdot 3^x - 4 = 0$

$a^2 + 3a - 4 = 0$

$(a-4)(a+1) = 0$

$a = -4$  or  $a = 1$

$3^x = -4$  or  $3^x = 1 = 3^0$

let  $a = 3^x$ ,  $(a^x)^t = a^{xt}$ ,  $a^x \cdot a^t = a^{x+t}$

Exponents can't create - ;  $a^0 = 1$

$x = 0$

32.  $e^{x+3} = \pi^x$

$\ln \pi^x = \ln e^{x+3}$

$\ln \pi^x = x+3$

$x \ln \pi = x+3$

$x \ln \pi - x = 3$

$x(\ln \pi - 1) = 3$

$x = \frac{3}{\ln \pi - 1}$

$y = \ln x \rightarrow x = e^y$

$\log_a a^r = r$

$ab - a = a(b-1)$

$\log_2(3x+2) - \log_4 x = 3$

$\log_2(3x+2) - \log_2 x = 3$

$\log_2(3x+2) - \frac{1}{2} \log_2 x = 3$

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$$\log_2(3x+2) - \log_2 x^{\frac{1}{2}} = 3$$

$$\log_2 \frac{(3x+2)}{x^{\frac{1}{2}}} = 3$$

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

$$x^{\frac{1}{2}} \cdot 8 = (3x+2) \cdot x^{\frac{1}{2}}$$

$$8x^{\frac{1}{2}} = 3x+2$$

$$8x^{\frac{1}{2}} - 3x - 2 = 0 \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{8 \pm \sqrt{8^2 - 4(3)(-2)}}{2(3)} = \frac{8 \pm \sqrt{64 - 24}}{6}$$

$$= \frac{8 \pm \sqrt{40}}{6} = \frac{8 \pm \sqrt{4 \cdot 10}}{6} = \frac{8 \pm 2\sqrt{10}}{6} = \frac{4 \pm \sqrt{10}}{3} = x$$

50.  $\log_2 x + \log_6 x = 3$

$$\frac{\log x}{\log 2} + \frac{\log x}{\log 6} = \frac{\log x + \log x}{\log 2 + \log 6} = \frac{\log x^2}{\log 12} = \frac{2 \log x}{\log 4 + \log 3}$$

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

$$\log_6 \cdot \frac{\log x}{\log 6} - 3 = 0 \cdot \log 6 \quad \log x - 3 = 0 \quad \log x = 3$$

$$10^3 = x \quad \text{1000} = x$$

44  $\log_2 x \log_2 x = 4$

$$\log_2 x \log_2 x = 4$$

$$(\log_2 x)^2 = 4$$

$$(\log_2 x)^2 = 2^2$$

$$\log_2 x = 2$$

$$2^2 = x$$

$$4 = x$$