

Exponential Equation Quiz Review

Date _____

Period _____

Solve each equation.

1) $3^{-2p-3} = 3^{-3p+1}$

$$\begin{aligned} -2p-3 &= -3p+1 \\ p &= 4 \end{aligned}$$

2) $2^{2n} = 2^{2-n}$

$$\begin{aligned} 2n &= 2-n \\ 3n &= 2 \\ n &= \frac{2}{3} \end{aligned}$$

3) $3^{3n} = 243$

$$\begin{aligned} 3^{3n} &= 3^5 \\ 3n &= 5 \\ n &= \frac{5}{3} \end{aligned}$$

4) $64^{k+1} = 16^{2k}$

$$\begin{aligned} (4^3)^{k+1} &= (4^2)^{2k} \\ 3k+3 &= 4k \\ 3 &= k \end{aligned}$$

5) $64^x = \frac{1}{32}$

$$\begin{aligned} (2^6)^x &= 2^{-5} \\ 6x &= -5 \\ x &= -\frac{5}{6} \end{aligned}$$

6) $\left(\frac{1}{4}\right)^{2a} = 64^{-3a}$

$$\begin{aligned} (4^{-1})^{2a} &= (4^3)^{-3a} \\ -2a &= -9a \\ 7a &= 0 \\ a &= 0 \end{aligned}$$

7) $216^{-k-2} = 36$

$$\begin{aligned} (6^3)^{-k-2} &= 6^2 \\ -3k-6 &= 2 \\ -3k &= 8 \\ k &= -\frac{8}{3} \end{aligned}$$

8) $\left(\frac{1}{1000}\right)^{-2x} = 100$

$$\begin{aligned} (10^{-3})^{-2x} &= 10^2 \\ 6x &= 2 \\ x &= \frac{1}{3} \end{aligned}$$

Solve each equation. Round your answers to the nearest thousandth.

9) $15^x = 13$

$$\begin{aligned} \log_{15} 13 &= x \\ \frac{\log 13}{\log 15} &= x \end{aligned}$$

$$x = 0.9472$$

10) $3^p = 11$

$$\begin{aligned} \log_3 11 &= p \\ \frac{\log 11}{\log 3} &= p \end{aligned}$$

$$p = 2.1827$$

11) $7^{-4x} = 40$

$$\begin{aligned} \log_7 40 &= -4x \\ \frac{\log 40}{\log 7} &= -4x \end{aligned}$$

$$\begin{aligned} 1.8957 &= -4x \\ -0.4739 &= x \end{aligned}$$

$$12) 5^{n+6} = 3$$

$$\log_5 3 = n+6 \rightarrow 0.6826 = n+6$$

$$\frac{\log 3}{\log 5} = n+6 \rightarrow -5.3174 = n$$

$$14) 18^{v+1} + 10 = 12$$

$$18^{v+1} = 2 \rightarrow 0.2398 = v+1$$

$$\log_{18} 2 = v+1 \rightarrow v = -0.7602$$

$$\frac{\log 2}{\log 18} = v+1$$

$$16) 14^{10-8x} + 3 = 61$$

$$14^{10-8x} = 58 \rightarrow -8.4614 = -8x$$

$$\log_{14} 58 = 10-8x \rightarrow 1.0577 = x$$

$$1.5386 = 10-8x$$

$$18) e^r = 70$$

$$r = \ln(70)$$

$$r = 4.2485$$

$$20) e^{v+5} - 3 = 38$$

$$\ln e^{v+5} = \ln(41)$$

$$v+5 = 3.7136$$

$$v = -1.2864$$

$$22) 8e^{2p+3} = 20$$

$$e^{2p+3} = 2.5$$

$$2p+3 = \ln(2.5)$$

$$2p = -2.0837$$

$$p = -1.0419$$

$$24) 9e^{2x} = 72$$

$$e^{2x} = 8$$

$$2x = \ln(8)$$

$$2x = 2.0794$$

$$x = 1.0397$$

$$13) 14^{8x} = 17$$

$$\log_{14} 17 = 8x \rightarrow 1.0736 = 8x$$

$$\frac{\log 17}{\log 14} = 8x \rightarrow 0.1342 = x$$

$$15) 3 \cdot 13^{-8x} = 2$$

$$13^{-8x} = 2/3$$

$$\log_{13} 2/3 = -8x$$

$$x = 0.0198$$

$$17) e^m = 81$$

$$\ln e^m = \ln 81$$

$$m = 4.3944$$

$$19) e^{-6x} - 4 = 34$$

$$e^{-6x} = 38$$

$$-6x = \ln(38)$$

$$x = -0.6063$$

$$21) 9e^{7p} = 99$$

$$e^{7p} = 11$$

$$\ln e^{7p} = \ln(11)$$

$$7p = 2.3979$$

$$p = 0.3426$$

$$23) e^{3k+9.2} + 6 = 46$$

$$e^{3k+9.2} = 40 \rightarrow k = -1.8370$$

$$3k+9.2 = \ln 40$$

$$3k+9.2 = 3.6889$$

$$3k = -5.5111$$

$$25) e^{m+8} + 4 = 71$$

$$e^{m+8} = 67$$

$$m+8 = \ln(67)$$

$$m = -3.7953$$