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## Solving Exponentials WS

Solve the equation. Round the result to 3 decimal places.

1.  $4^x = 16$

$$\log_4 16 = x$$

$$\boxed{2 = x}$$

3.  $5^x = 625$

$$\log_5 625 = x$$

$$\boxed{4 = x}$$

5.  $8^x = 4$

$$\log_8 4 = x$$

$$\boxed{.67 = x} \quad \text{or} \quad \boxed{\frac{2}{3} = x}$$

7.  $\left(\frac{1}{4}\right)^x = 64$

$$\log_{\frac{1}{4}} 64 = x$$

$$\boxed{-3 = x}$$

9.  $3^{x-1} = 27$

$$\log_3 27 = x - 1$$

$$3 = x - 1$$

$$+1 \quad +1$$

$$\boxed{x = 4}$$

11.  $e^x = 4$

$$\log_e 4 = x$$

$$\ln 4 = x$$

$$\boxed{1.39 = x}$$

13.  $4e^{2x} = 40$

$$\frac{4}{4} \frac{e^{2x}}{1} = \frac{40}{4}$$

$$e^{2x} = 10$$

$$\log_e 10 = 2x$$

$$\ln 10 = 2x$$

$$2.30 = 2x$$

$$\boxed{1.15 = x}$$

2.  $3^x = 243$

$$\log_3 243 = x$$

$$\boxed{5 = x}$$

4.  $7^x = \frac{1}{49}$

$$\log_7 \frac{1}{49} = x$$

$$\boxed{-2 = x}$$

6.  $\left(\frac{1}{2}\right)^x = 32$

$$\log_{\frac{1}{2}} 32 = x$$

$$\boxed{-5 = x}$$

8.  $\left(\frac{3}{4}\right)^x = \frac{27}{64}$

$$\log_{\frac{3}{4}} \frac{27}{64} = x$$

$$\boxed{3 = x}$$

10.  $e^x = 2$

$$\log_e 2 = x$$

$$\ln 2 = x$$

$$\boxed{x = .69}$$

12.  $6^{5x} = 3000$

$$\log_6 3000 = 5x$$

$$4.47 = 5x$$

$$\boxed{x = 0.894}$$

14.  $4^{-3t} = 0.10$

$$\log_4 0.10 = -3t$$

$$-1.66 = -3t$$

$$\boxed{t = .55}$$

15.  $2^{3-x} = 565$

$$\log_2 565 = 3 - x$$

$$9.14 = 3 - x$$

$$6.14 = -x$$

$$\boxed{x = -6.14}$$

16.  $500e^{-x} = 300$

$$\frac{500}{500} e^{-x} = \frac{300}{500}$$

$$e^{-x} = \frac{3}{5}$$

$$-.51 = -x$$

$$\boxed{x = .51}$$

$$\ln \frac{3}{5} = -x$$

17.  $7 - 2e^x = 5$

$$-7 \quad -7$$

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

$$e^x = 1$$

$$\log_e 1 = x$$

$$\ln 1 = x$$

$$\boxed{0 = x}$$

18.  $-\frac{1}{4} + 3e^{2x} = 11$

$$+\frac{1}{4} \quad +\frac{1}{4}$$

$$\frac{3e^{2x}}{3} = \frac{25}{3}$$

$$e^{2x} = \frac{25}{3}$$

$$\ln \frac{25}{3} = 2x$$

$$\boxed{x = 1.06}$$

$$2.12 = 2x$$