

F.LE.A.4: Exponential Equations 1

- 1 What is the solution of $2(3^{x+4}) = 56$?
 - 1) $x = \log_3(28) - 4$
 - 2) $x = -1$
 - 3) $x = \log(25) - 4$
 - 4) $x = \frac{\log(56)}{\log(6)} - 4$
- 2 If $4(10^{5x-2}) = 12$ then x equals
 - 1) $\frac{2.3}{5}$
 - 2) $\frac{1}{3} \left(\frac{\log 12}{\log 40} + 5 \right)$
 - 3) $\frac{\log(3) + 2}{5}$
 - 4) $\frac{1}{5} \left(\frac{\log 12}{\log 4} + 2 \right)$
- 3 If $ae^{bt} = c$, where a , b , and c are positive, then t equals
 - 1) $\ln\left(\frac{c}{ab}\right)$
 - 2) $\ln\left(\frac{cb}{a}\right)$
 - 3) $\frac{\ln\left(\frac{c}{a}\right)}{b}$
 - 4) $\frac{\ln\left(\frac{c}{a}\right)}{\ln b}$
- 4 The solution to the equation $6(2^{x+4}) = 36$ is
 - 1) -1
 - 2) $\frac{\ln 36}{\ln 12} - 4$
 - 3) $\ln(3) - 4$
 - 4) $\frac{\ln 6}{\ln 2} - 4$
- 5 What is the solution to $8(2^{x+3}) = 48$?
 - 1) $x = \frac{\ln 6}{\ln 2} - 3$
 - 2) $x = 0$
 - 3) $x = \frac{\ln 48}{\ln 16} - 3$
 - 4) $x = \ln 4 - 3$
- 6 The solution to the equation $5e^{x+2} = 7$ is
 - 1) $-2 + \ln\left(\frac{7}{5}\right)$
 - 2) $\left(\frac{\ln 7}{\ln 5}\right) - 2$
 - 3) $\frac{-3}{5}$
 - 4) $-2 + \ln(2)$
- 7 The solution of $87e^{0.3x} = 5918$, to the *nearest thousandth*, is
 - 1) 0.583
 - 2) 1.945
 - 3) 4.220
 - 4) 14.066
- 8 To the *nearest tenth*, the solution to the equation $4300e^{0.07x} - 123 = 5000$ is
 - 1) 1.1
 - 2) 2.5
 - 3) 6.3
 - 4) 68.5
- 9 Which expression is *not* a solution to the equation $2^t = \sqrt[3]{10}$?
 - 1) $\frac{1}{2} \log_2 10$
 - 2) $\log_2 \sqrt[3]{10}$
 - 3) $\log_4 10$
 - 4) $\log_{10} 4$
- 10 Given $a > 0$, solve the equation $a^{x+1} = \sqrt[3]{a^2}$ for x algebraically.
- 11 Solve algebraically for x to the *nearest thousandth*: $2e^{0.49x} = 15$
- 12 Solve $3.8e^{1.5t} = 16$ algebraically for t to the *nearest hundredth*.

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Answer Section

1 ANS: 1

$$\log 3^{x+4} = \log 28$$

$$\frac{(x+4)\log 3}{\log 3} = \frac{\log 28}{\log 3}$$

$$x+4 = \frac{\log 28}{\log 3}$$

$$x = \log_3 28 - 4$$

REF: 082306aii

2 ANS: 3

$$10^{5x-2} = 3$$

$$\log 10^{5x-2} = \log 3$$

$$(5x-2) \log 10 = \log 3$$

$$5x-2 = \log 3$$

$$5x = \log 3 + 2$$

$$x = \frac{\log 3 + 2}{5}$$

REF: 012517aii

3 ANS: 3

$$e^{bt} = \frac{c}{a}$$

$$\ln e^{bt} = \ln \frac{c}{a}$$

$$bt \ln e = \ln \frac{c}{a}$$

$$t = \frac{\ln \frac{c}{a}}{b}$$

REF: 011813aii

4 ANS: 4

$$6(2^{x+4}) = 36$$

$$\ln 2^{x+4} = \ln 6$$

$$(x+4)\ln 2 = \ln 6$$

$$x+4 = \frac{\ln 6}{\ln 2}$$

$$x = \frac{\ln 6}{\ln 2} - 4$$

REF: 082408aii

5 ANS: 1

$$8(2^{x+3}) = 48$$

$$2^{x+3} = 6$$

$$(x+3)\ln 2 = \ln 6$$

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

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

REF: 061702aii

6 ANS: 1

$$\ln e^{x+2} = \ln \frac{7}{5}$$

$$(x+2)\ln e = \ln \frac{7}{5}$$

$$x = -2 + \ln \frac{7}{5}$$

REF: 062207aii

7 ANS: 4

$$\ln e^{0.3x} = \ln \frac{5918}{87}$$

$$x = \frac{\ln \frac{5918}{87}}{0.3}$$

REF: 081801aii

8 ANS: 2

$$4300e^{0.07x} = 5123$$

$$\ln e^{0.07x} = \ln \frac{5123}{4300}$$

$$0.07x = \ln \frac{5123}{4300}$$

$$x = \frac{\ln \frac{5123}{4300}}{0.07}$$

$$x \approx 2.5$$

REF: 012302aii

9 ANS: 4

$$\log 2' = \log \sqrt{10} \quad 2) \frac{\log \sqrt{10}}{\log 2} = \log_2 \sqrt{10}, \quad 1) \log_2 \sqrt{10} = \log_2 10^{\frac{1}{2}} = \frac{1}{2} \log_2 10, \quad 3) \log_4 10 = \frac{\log_2 10}{\log_2 4} = \frac{1}{2} \log_2 10$$

$$t \log 2 = \log \sqrt{10}$$

$$t = \frac{\log \sqrt{10}}{\log 2}$$

REF: 012009aii

10 ANS:

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

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

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

REF: 012326aii

11 ANS:

$$\ln e^{0.49x} = \ln 7.5$$

$$0.49x = \ln 7.5$$

$$x = \frac{\ln 7.5}{0.49} \approx 4.112$$

REF: 062330aii

12 ANS:

$$\ln e^{1.5t} = \ln \frac{16}{3.8}$$

$$1.5t = \ln \frac{16}{3.8}$$

$$t = \frac{\ln \frac{16}{3.8}}{1.5} \approx .96$$

REF: 062426aii