

Solving Exponential Equations w/ different bases practice

1. $5^{2x-3} = 18$

2. $8^{4x+1} = 205$

3. $e^{4x-9} = 56$

4. $9^{-2x+7} - 17 = 200$

5. $2e^{5x+11} - 21 = 71$

6. $11^{4x-3} = 7^{2x+5}$

7. $6^{3x+1} = 4^{5x+2}$

8. $2^{x-2} = 3^{2x-4}$

9. $5^{2x} = 21$

Solving Exponential Equations w/ different bases practice

1. $5^{2x-3} = 18$

$$\log 5^{2x-3} = \log 18$$

$$(2x-3)\log 5 = \log 18$$

$$2x\log 5 - 3\log 5 = \log 18$$

$$x = \frac{\log 18 + 3\log 5}{2\log 5}$$

2. $8^{4x+1} = 205$

$$\log 8^{4x+1} = \log 205$$

$$(4x+1)\log 8 = \log 205$$

$$4x\log 8 + \log 8 = \log 205$$

$$4x\log 8 = \log 205 - \log 8$$

$$x = \frac{\log 205 - \log 8}{4\log 8}$$

3. $e^{4x-9} = 56$

$$\ln e^{4x-9} = \ln 56$$

$$(4x-9)\ln e = \ln 56$$

$$4x-9 = \ln 56$$

$$x = \frac{\ln 56 + 9}{4}$$

4. $9^{-2x+7} - 17 = 200$

$$9^{-2x+7} = 217$$

$$\log 9^{-2x+7} = \log 217$$

$$-2x+7(\log 9) = \log 217$$

$$-2x\log 9 + 7\log 9 = \log 217$$

$$-2x\log 9 = \log 217 - 7\log 9$$

$$x = \frac{\log 217 - 7\log 9}{-2\log 9}$$

5. $2e^{5x+11} - 21 = 71$

$$e^{5x+11} = 46$$

$$\ln(e^{5x+11}) = \ln 46$$

$$(5x+11)(\ln e) = \ln 46$$

$$5x+11 = \ln 46$$

$$x = \frac{\ln 46 - 11}{5}$$

6. $11^{4x-3} = 7^{2x+5}$

$$\log 11^{4x-3} = \log 7^{2x+5}$$

$$(4x-3)\log 11 = (2x+5)\log 7$$

$$4x\log 11 - 3\log 11 = 2x\log 7 + 5\log 7$$

$$4x\log 11 - 2x\log 7 = 3\log 11 + 5\log 7$$

$$x = \frac{3\log 11 + 5\log 7}{4\log 11 - 2\log 7}$$

7. $6^{3x+1} = 4^{5x+2}$

$$\log 6^{3x+1} = \log 4^{5x+2}$$

$$(3x+1)\log 6 = (5x+2)\log 4$$

$$3x\log 6 + \log 6 = 5x\log 4 + 2\log 4$$

$$3x\log 6 - 5x\log 4 = 2\log 4 - \log 6$$

$$x = \frac{2\log 4 - \log 6}{3\log 6 - 5\log 4}$$

8. $2^{x-2} = 3^{2x-4}$

$$\log 2^{x-2} = \log 3^{2x-4}$$

$$(x-2)\log 2 = (2x-4)\log 3$$

$$x\log 2 - 2\log 2 = 2x\log 3 - 4\log 3$$

$$x\log 2 - 2x\log 3 = 2\log 2 - 4\log 3$$

$$x = \frac{2\log 2 - 4\log 3}{\log 2 - 2\log 3}$$

9. $5^{2x} = 21^x$

$$\log 5^{2x} = \log 21$$

$$2x\log 5 = \log 21$$

$$x = \frac{\log 21}{2\log 5}$$

Solving Exponential Equations w/ different Bases

$$6^{2x} = 8^{1-x}$$

1. equality rule
2. exponent rule
3. solve for x
4. simplify logs in calc

EX. $3^x - 1 = 4$
 $3^x = 5$

$$\log 3^x = \log 5$$

$$x \log 3 = \log 5$$

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

$$x = 1.4690$$

EX. $5^{x-1} - 2^x = 0$

$$5^{x-1} = 2^x$$

$$\log 5^{x-1} = \log 2^x$$

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

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

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

$$\frac{- \log 5}{\log 2 - \log 5} = x$$

$$x = 1.7565$$