

Solve the Exponential Equation.

<p>1. $5^{3-2x} = 5^{-x}$ $5^{-3} = 5^{-3}$ ✓</p> $\begin{array}{r} 3-2x = -x \\ +2x \quad +2x \\ \hline 3 = x \end{array}$	<p>2. $3^{2a} = 3^{-a}$ $3^0 = 3^0$ ✓</p> $\begin{array}{r} 2a = -a \\ +a \quad +a \\ \hline 3a = 0 \\ a = 0 \end{array}$
<p>3. $4^{2p} = 4^{-2p-1}$ $4^{0.5} = 4^{-0.5}$ ✓</p> $\begin{array}{r} 2p = -2p-1 \\ +2p \quad +2p \\ \hline 4p = -1 \\ p = -\frac{1}{4} \text{ or } -.25 \end{array}$	<p>4. $6^{-2x} = 6^{2-3x}$ $6^{-4} = 6^{-4}$ ✓</p> $\begin{array}{r} -2x = 2-3x \\ +3x \quad +3x \\ \hline x = 2 \end{array}$
<p>5. $8^{x-1} = 2^{x+2}$ $8^{1.5} = 2^{4.5}$ ✓</p> $\begin{array}{r} (2^3)^{x-1} \\ 2^{3x-3} = 2^{x+2} \\ 3x-3 = x+2 \\ -x \quad +3 \quad -x \quad +3 \\ \hline 2x = 5 \\ x = \frac{5}{2} \text{ or } 2.5 \end{array}$	<p>6. $144^{2x+1} = 12^{5x-1}$ $144^7 = 12^{14}$ ✓</p> $\begin{array}{r} 12^{4x+2} = 12^{5x-1} \\ 4x+2 = 5x-1 \\ -4x \quad +1 \quad -4x \quad +1 \\ \hline 3 = x \end{array}$
<p>7. $5^{3x+1} = 25^{x+1}$ $5^4 = 25^2$ ✓</p> $\begin{array}{r} 5^{3x+1} = 5^{2x+2} \\ 3x+1 = 2x+2 \\ -2x \quad -2x \\ \hline x+1 = 2 \\ -1 \quad -1 \\ \hline x = 1 \end{array}$	<p>8. $4^{-x+1} = 2^{2x}$ $4^{1/2} = 2^1$ ✓</p> $\begin{array}{r} 2^{-2x+2} = 2^{2x} \\ -2x+2 = 2x \\ +2x \quad +2x \\ \hline 2 = 4x \\ \frac{2}{4} = \frac{4x}{4} \\ .5 \text{ or } \frac{1}{2} = x \end{array}$
<p>9. $64^a = 8^{a+2}$ $64^2 = 8^4$ ✓</p> $\begin{array}{r} 8^{2a} = 8^{a+2} \\ 2a = a+2 \\ a = 2 \end{array}$	<p>10. $2^{m+1} = 16^{m+7}$ $2^{-8} = 16^{-2}$ ✓</p> $\begin{array}{r} 2^{m+1} = 2^{4m+28} \\ m+1 = 4m+28 \\ -m-28 \quad -m-28 \\ \hline -27 = 3m \\ -9 = m \end{array}$

11. $6^{2x} = 216^{x-1}$
 $6^{4x} = 6^{3x-3}$
 $4x = 3x - 3$
 $-3x - 3x$

 $x = -3$

$36^6 = 216^4$

12. $3^{a-7} = 27^{2a}$
 $3^{a-7} = 3^{6a}$
 $a-7 = 6a$
 $-a - a$

 $-7 = 5a$
 $\frac{-7}{5} = \frac{5a}{5}$
 $a = -7/5 \text{ or } -1.4$

$3^{-8.4} = 27^{-2.8}$

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

 $-2 = 2x - 1$
 $+1 +1$

 $-1 = 2x$
 $x = -1/2 \text{ or } -0.5$

$(\frac{1}{3})^{1.5} = 3^{-1.5}$

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

 $-2x = 3$
 $\frac{-2x}{-2} = \frac{3}{-2}$
 $x = -3/2 \text{ or } -1.5$

$(\frac{1}{2})^{-1.5} = 2^{1.5}$

15. $8^{x-1} = 2^{x+2}$
 $2^{3x-3} = 2^{x+2}$
 $3x-3 = x+2$
 $-x -x$

 $2x-3 = 2$
 $+3 +3$

 $2x = 5$
 $x = 5/2 \text{ or } 2.5$

$8^{1.5} = 2^{4.5}$

16. $8^{5x} = 16^{3x+4}$
 $2^{15x} = 2^{12x+16}$
 $15x = 12x + 16$
 $-12x -12x$

 $3x = 16$
 $x = 16/3$

$8^{20/3} = 16^{20}$

17. $81^{2x+1} = 9^{5x-1}$
 $9^{4x+2} = 9^{5x-1}$
 $4x+2 = 5x-1$
 $-4x -4x$

 $2 = x - 1$
 $+1 +1$

 $3 = x$

$81^7 = 9^{14}$

18. $16^{x+1} = 4^{4x+1}$
 $4^{2x+2} = 4^{4x+1}$
 $2x+2 = 4x+1$
 $-2x -2x$

 $2 = 2x + 1$
 $-1 -1$

 $1 = 2x$
 $x = 1/2 \text{ or } 0.5$

$16^{1.5} = 4^3$