# Section 7.3: Solving Exponential Equations

1. $2^x = 16$

$2 \cdot 2 \cdot 2 \cdot 2 = 16$

$2^x = 2^4$

$x = 4$

2. $8^{3x-4} + 7 = 71$

$8^{3x-4} = 64$

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

$3x - 4 = 2$

$3x = 6$

$x = 2$

3) $\frac{4(3^{x+2})}{4} = \frac{36}{4}$

$3^{x+2} = 9$

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

$x + 2 = 2$

$x = 0$

4) $\dfrac{125^{x+2} \cdot 25^{2(x+1)}}{5^{3x-2}} = \left(\dfrac{1}{625}\right)^{-\frac{1}{2}x}$

$\dfrac{(5^3)^{x+2} \cdot (5^2)^{2x+2}}{5^{3x-2}} = (5^{-4})^{-\frac{1}{2}x}$

$\dfrac{5^{3x+6} \cdot 5^{4x+4}}{5^{3x-2}} = 5^{2x}$

$\dfrac{5^{7x+10}}{5^{3x-2}} = 5^{2x}$

$5^{7x+10-(3x-2)} = 5^{2x}$

$5^{4x+12} = 5^{2x}$

$4x+12 = 2x$

$4x-2x = -12$

$2x = -12$

$x = -6$

# Radicals

$\sqrt{3} \rightarrow 3^{1/2}$

$\sqrt[3]{4} \rightarrow 4^{1/3}$

$\sqrt[4]{10} \rightarrow 10^{1/4}$

$\sqrt[3]{5^2} \rightarrow 5^{\frac{2}{3}}$

ex) $9^{2x-1} = \sqrt[4]{27^x}$

$(3^2)^{2x-1} = \sqrt[4]{3^{3x}}$

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

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

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

$\frac{13}{4}x = 2$

$x = \frac{8}{13}$