1. Expand using all the properties of logarithms.

$$\log\left[\frac{1}{A^4}\left(\frac{\sqrt{B}}{C^2}\right)^3\right]$$

$$\log\frac{1}{A^4}\cdot\frac{B^{3/2}}{C^6} = \log\frac{B^{3/2}}{A^4C^6}$$

$$\frac{3}{2}\log B - 4\log A - 6\log C$$

2. Write as a single logarithm.

$$5\log D - \frac{1}{3}(4\log E - \frac{1}{2}\log F)$$

$$5\log D - \frac{4}{3}\log E + \frac{1}{6}\log F$$

$$\log\frac{D^5\sqrt[6]{F}}{\sqrt[3]{E^4}}$$

Solve each. Round to the nearest hundredth.

3. $2\cdot 3^{\frac{1}{x}} + 5 = 21$

$$\left(3^{\frac{1}{x}}\right)^{x} = (8)^{x}$$

$$3 = 8^x$$

$$\log_8 3 = x$$

$$\frac{\log 3}{\log 8} = 0.53$$

$$\log_3 8 = \frac{1}{x}$$

$$\frac{\log 8}{\log 3}$$

$$\frac{1.89}{1} = \frac{1}{x}$$

$$x = \frac{1}{1.89}$$

$$x = .53$$

4. $2\log_4(x+1)=3$

$$\log_4(x+1) = \frac{3}{2}$$

$$4^{\frac{3}{2}} = x+1$$

$$8 = x+1$$

$$x = 7$$

$$\log_4(x+1)^2 = 3$$

$$4^3 = (x+1)^2$$

$$64 = x^2+2x+1$$

$$0 = x^2+2x-63$$

$$(x+9)(x-7)$$

$(x=7, -9)$