

Property of Logs:

$x = y$  is equivalent to  $\log_a x = \log_a y$

$$\ln x = \ln y$$

**Ex 1**

Solve  $7^x = 12$

$$\ln 7^x = \ln 12$$

$$x \frac{\cancel{\ln 7}}{\ln 7} = \frac{\ln 12}{\ln 7} \quad \left. \vphantom{\frac{\ln 12}{\ln 7}} \right\} \text{exact answer}$$

$$x \approx \boxed{1.277} \quad \text{approximate answer}$$

**Ex 2**

Solve  $3^{2x-1} = 0.4^{x+2}$

Round to  
thousandth  
(3 decimal  
places)

$$\ln 3^{2x-1} = \ln 0.4^{x+2}$$

$$(2x-1)\ln 3 = (x+2)\ln 0.4$$

$$\begin{array}{r} 2(\cancel{x})\ln 3 - \cancel{\ln 3} = (\cancel{x})\ln 0.4 + 2\ln 0.4 \\ -x\ln 0.4 + \cancel{\ln 3} \quad -x\cancel{\ln 0.4} \quad + \ln 3 \end{array}$$

$$2(\cancel{x})\ln 3 - (\cancel{x})\ln 0.4 = 2\ln 0.4 + \ln 3$$

$$\cancel{x} \left( \frac{2\ln 3 - \cancel{\ln 0.4}}{2\ln 3 - \cancel{\ln 0.4}} \right) = \frac{2\ln(0.4) + \ln(3)}{2\ln(3) - \ln(0.4)} \quad \text{exact answer}$$

$$x \approx \boxed{-0.236} \quad \text{approximate answer}$$

4.5 **Ex 3** Solve the equation

Day 1 (2)

(a)  $e^{x^2} = 200$

$$\ln e^{x^2} = \ln 200$$

$$x^2 \ln e^{\cancel{1}} = \ln 200$$

$$\sqrt{x^2} = \pm \sqrt{\ln 200}$$

$$x = \boxed{\pm \sqrt{\ln 200}} \quad \underline{\text{exact}}$$

$$x \approx \boxed{\pm 2.302} \quad \underline{\text{approximate}} \quad \#21, 23$$

**Ex 5** Solve the equation. Give EXACT value.

(a)  $\frac{7 \ln x}{7} = \frac{28}{7}$

$$\ln x = 4$$

$$\log_e x = 4$$

$$\boxed{e^4} = x \quad \underline{\text{Exact}}$$

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