

P.211

3-4 Exponential and Logarithmic Equations

$$\log_a a^x = x$$

$$a^{\log_a x} = x$$

Warm-up: Solve $2^x = 64$

$$x = 6$$

Ex 1 Solve $2^x = 60$ $x \approx 5.908$

$$\log 2^x = \log 60$$

$$\frac{x \cdot \log 2}{\log 2} = \frac{\log 60}{\log 2}$$

Ex 2 Solve $e^x - 7 = 12$

$$\ln e^x = \ln 19$$

$$x \cdot \ln e = \ln 19$$

$$x = \ln 19 \approx 2.94$$

Ex 3 Solve $5e^{3x} + 4 = 10$

$$5e^{3x} = 6$$

$$\ln e^{3x} = \ln 1.2$$

$$3x \ln e = \ln 1.2$$

$$3x = \ln 1.2$$

$$x = \frac{\ln 1.2}{3} \approx .061$$

Ex 4 Solve $e^{2x} - 7e^x + 12 = 0$

$$(e^x - 3)(e^x - 4) = 0$$

$$e^x - 3 = 0$$

$$\ln e^x = \ln 3$$

$$x \ln e = \ln 3$$

$$x = \ln 3$$

$$x \approx 1.0986$$

$$e^x - 4 = 0$$

$$\ln e^x = \ln 4$$

$$x = \ln 4$$

$$x \approx 1.386$$

$$y^2 - 7y + 12 = 0$$

$$(y - 4)(y - 3) = 0$$

$$y - 4 = 0 \quad y - 3 = 0$$

$$y = 4 \quad y = 3$$

Ex 5 Solve $\log_{10} x = 2$

$$10^2 = x$$

$$100 = x$$

Ex 6 Solve $7 \ln(2x) = 10$

$$\ln_e(2x) = \frac{10}{7}$$

$$\frac{e^{\frac{10}{7}}}{2} = \frac{2x}{2}$$

$$x \approx 2.086$$

Homework

p.221

#17-37, 45-53, 85-93

odds