

2-5 Natural Logarithms

What are the solutions of $\ln(x-3)^2 = 4$?

$$\ln(x-3)^2 = 4$$

$$\sqrt{(x-3)^2} = \sqrt{e^4}$$

$$x-3 = \pm e^2$$

$$+3 \quad +3$$

$$x = 3 \oplus e^2$$

$$3 + e^2$$

$$3 - e^2$$

$$= 10.389$$

$$= -4.389$$

$$\ln x = 2$$

$$\ln x = 2$$

$$x = e^2$$

$$x = 7.389$$

$$\ln(3x + 5)^2 = 4$$

$$\sqrt{(3x + 5)^2} = \sqrt{e^4}$$

$$3x + 5 = \pm e^2$$

$$\frac{\cancel{3x} = -5 \pm e^2}{3}$$

$$\frac{-5 + e^2}{3}$$

or

$$\frac{-5 - e^2}{3}$$

$$0.796$$

$$-4.1296$$

$$b) \quad \frac{3 \ln 2x}{3} = \frac{3}{3}$$

$$\ln 2x = 1$$

$$\frac{dx}{x} = \frac{e^1}{2}$$

$$x = 1.359$$

$$\ln 2x + \ln 3 = 2$$

What is the solution of $4e^{2x} + 2 = 16$?

$$e^{x-2} = 12$$

$$2e^{-x} = 20$$

$$e^{3x} + 5 = 15$$