

Find the exact solution algebraically, and check it by substituting into the original equation.

$$1. \frac{50e^{0.035x}}{50} = \frac{200}{50} \quad X = \frac{\ln 4}{.035} \checkmark$$

$$e^{.035x} = 4 \quad \approx 39.608$$

$$.035x = \ln 4$$

$$2. \underset{-3}{3} + \underset{-3}{2e^{-x}} = \underset{-3}{6} \quad -x = \ln\left(\frac{3}{2}\right)$$

$$2e^{-x} = 3$$

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

$$3. \underset{-3}{-3} - \log(x+2) = \underset{-3}{-5}$$

$$-\log(x+2) = 2$$

$$\log(x+2) = -2$$

$$10^{-2} = x+2$$

$$x = 10^{-2} - 2$$

$$x = -\ln\left(\frac{3}{2}\right) \\ = \frac{1}{\ln\left(\frac{2}{3}\right)} \approx -.405$$

$$4. 0.98^x = 1.6$$

$$x \ln .98 = \ln 1.6$$

$$x = \frac{\ln 1.6}{\ln .98} \approx -23.264$$

$$5. \underset{-4}{3} \ln(x-3) + \underset{-4}{4} = \underset{-4}{5}$$

$$\frac{3 \ln(x-3)}{3} = \frac{1}{3}$$

$$\ln(x-3) = \frac{1}{3}$$

$$e^{1/3} = x-3$$

$$x = e^{1/3} + 3$$

$$\approx 4.396$$

$$6. \log x^2 = 6$$

$$\sqrt{10^6} = \sqrt{x^2}$$

$$(10^6)^{\frac{1}{2}} = x$$

$$10^3 = x$$

$$1000 = x$$

Find the exact solution algebraically, and check it by substituting into the original equation.

$$2y^2 + 5y - 3$$

$$(2y-1)(y+3)$$

1. $2e^{2x} + 5e^x - 3 = 0$

$$(2e^x - 1)(e^x + 3) = 0$$

$$2e^x - 1 = 0 \quad e^x + 3 = 0$$

2. $\frac{1}{2} \ln(x+3) - \ln x = 0$

3. $\ln(x-3) + \ln(x+4) = 3 \ln 2$

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

$$x^2 + x - 12 = 8$$

$$x^2 + x - 20 = 0$$

$$(x+5)(x-4) = 0$$

$$\cancel{x = -5} \quad x = 4$$

extraneous

4. $\frac{400}{1+95e^{-0.6x}} = 150$

5. $\log x - \frac{1}{2} \log(x+4) = 1$

$$\log \frac{x}{\sqrt{x+4}} = 1$$

$$\frac{x}{\sqrt{x+4}} = 10^1$$

$$\left(\frac{x}{10}\right)^2 = (\sqrt{x+4})^2$$

$$\frac{x^2}{100} = x + 4$$

$$x^2 = 100x + 400$$

$$x^2 - 100x - 400 = 0$$

6. $\frac{500}{1+25e^{0.3x}} = 200$

$$\frac{100 \pm \sqrt{(-100)^2 - 4(1)(-400)}}{2}$$

$$\frac{100 \pm \sqrt{11,600}}{2}$$

Find the exact solution algebraically, and check it by substituting into the original equation.

1. $2e^{2x} + 3e^x - 5 = 0$

2. $\frac{2^x + 2^{-x}}{2} = 3$