

EXPONENTIAL & LOG FUNCTIONS

$$y = 2^x$$

$$b > 0, b \neq 1$$

$$b = (0, 1) \cup (1, \infty)$$

$$y = b^x \iff x = \log_b y$$

$$\ln_2 e^8 = 81$$

$$e^{2 \ln 5} = e^{\ln 125} = 125$$

$$\ln a + \ln b = \ln(ab)$$

$$\ln a - \ln b = \ln\left(\frac{a}{b}\right)$$

$$\ln a^p = p \ln a$$

$$27^{2/3} = \sqrt[3]{27^2} = 3^2 = 9$$

Solve.

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

$$\ln_2(x^2 - 2x - 3) = \ln_2 x^2$$

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

$$x^2 - 2x - 3 = x^2$$

$$-2x = 3$$

$$x = \frac{-3}{2} \text{ No sol.}$$

$$42e^{5x-3} + 9 = 282$$

$$-9 \quad -9$$

$$\frac{42e^{5x-3}}{42} = \frac{273}{42}$$

$$\ln e^{5x-3} = \ln 6.5$$

$$5x-3 = \ln(6.5)$$

$$x = \frac{\ln(6.5) + 3}{5}$$

$$\approx 0.97$$

$$\ln x - \ln(2x-1) = 8$$

$$\ln\left(\frac{x}{2x-1}\right) = e^8$$

$$\frac{x}{2x-1} = e^8(2x-1)$$

$$x = 2e^8 x - e^8$$

$$e^8 = 2e^8 x - x$$

$$e^8 = x(2e^8 - 1)$$

$$\frac{e^8}{2e^8 - 1} = x$$

$$x \approx 0.50$$

PARTIAL FRACTIONS

$$\frac{26x-43}{\cancel{6x^2-19x+10}} = \frac{\cancel{(2x-5)} A}{\cancel{(3x-2)} 2x-5} + \frac{\cancel{(2x-5)} B}{\cancel{(3x-2)} 3x-2}$$

$$26x-43 = A(3x-2) + B(2x-5)$$

$$26x-43 = 3Ax-2A + 2Bx-5B$$

$$26 = 3A + 2B$$

$$-43 = -2A - 5B$$

$$\begin{bmatrix} 3 & 2 \\ -2 & -5 \end{bmatrix}^{-1} \cdot \begin{bmatrix} 26 \\ -43 \end{bmatrix} = \begin{bmatrix} 4 \\ 7 \end{bmatrix}$$

$$\int \frac{4}{2x-5} + \int \frac{7}{3x-2}$$

$$\frac{\text{~~~~~}}{(x^3+7)(2x^2-5)} = \frac{Ax^2+Bx+C}{x^3+7} + \frac{Dx+E}{2x^2-5}$$

$$\frac{\text{~~~~~}}{x^3(x-4)^2} = \frac{A}{(x-4)^2} + \frac{B}{(x-4)^1} + \frac{C}{x^3} + \frac{D}{x^2} + \frac{E}{x}$$

$(x^1)^3$
 $(x^1)^3$

LINESSlope-intercept
 $y = mx + b$ Point-Slope
 $y - y_1 = m(x - x_1)$ 