

Name: Solutions

1. Solve for x:

make this the power

$$2\ln(x) - \ln(x+6) = \ln\left(\frac{1}{3}\right) + \ln(9)$$

$$2\ln(x) - \ln(x+6) = \ln\left(\frac{1}{3}\right) + \ln(9)$$

$$\ln(x^2) - \ln(x+6) = \ln\left(\frac{1}{3}\right) + \ln(9)$$

$$\Rightarrow \ln\left(\frac{x^2}{x+6}\right) = \ln\left(\frac{1}{3} \cdot 9\right)$$

$$\Rightarrow \ln\left(\frac{x^2}{x+6}\right) = \ln(3)$$

$$\Rightarrow \frac{x^2}{x+6} = 3$$

$$x^2 = 3(x+6)$$

$$x^2 = 3x + 18$$

$$x^2 - 3x - 18 = 0$$

$$(x-6)(x+3) = 0 \Rightarrow x = -3$$

$$x = 6$$

can't plug in a negative for $\ln$

2. Evaluate

$$\lim_{x \rightarrow 0} \frac{\sqrt{-\cos(x) + 12}}{x^{3/5} + 7}$$

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Try plugging in 0

$$\frac{\sqrt{-\cos(0) + 12}}{0^{3/5} + 7} = \frac{\sqrt{-1 + 12}}{7} = \frac{\sqrt{11}}{7}$$

$$\cos(0) = 1$$