Review:

Thursday, March 19, 2015
12:03 PM

Factor into linear factors:

$$f(x) = x^3 - 8x - 3$$

$$\frac{p}{q} = \frac{\pm 1, \pm 3}{\pm 1} = \pm 1, \pm 3$$

$f(1) \neq 0$

$f(-1) \neq 0$

$f(3) = 0$ ✓ $\therefore (x-3)$ is a factor

$$\begin{array}{r} x^2 + 3x + 1 \\ x-3 \overline{\big) x^3 + 0x^2 - 8x - 3} \\ \underline{x^3 - 3x^2} \qquad\quad \\ 3x^2 - 8x \quad \\ \underline{3x^2 - 9x} \quad \\ x - 3 \end{array}$$

$$\begin{array}{r|rrrr} 3 & 1 & 0 & -8 & -3 \\ & & 3 & 9 & 3 \\ \hline & 1 & 3 & 1 & 0 \end{array}$$

solve $x^2 + 3x + 1 = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-3 \pm \sqrt{9-4}}{2}$$

$$= \frac{-3 \pm \sqrt{5}}{}$$

$$= \frac{-3 \pm \sqrt{5}}{2}$$

$$f(x) = (x-3)\left(x - \frac{-3+\sqrt{5}}{2}\right)\left(x - \frac{-3-\sqrt{5}}{2}\right)$$

$$= (x-3)\left(x + \frac{3-\sqrt{5}}{2}\right)\left(x + \frac{3+\sqrt{5}}{2}\right)$$

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solve:

$$\ln x + \ln(1-x) = \ln(2x-12)$$

$$\ln x(1-x) = \ln(2x-12)$$

$$x(1-x) = 2x-12$$

$$x - x^2 = 2x - 12$$

$$0 = x^2 + x - 12$$

$$= (x-3)(x+4)$$

$$x = \cancel{3}, \cancel{-4}$$

$$\emptyset$$

check:

$x = 3$

$\cancel{\ln 3 + \ln(-2)}$

$\cancel{x = -4}$

$\cancel{\ln -4}$