Review:

Thursday, March 17, 2016
11:03 AM

factor into linear factors:

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

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

$f(1) \neq 0$

$f(-1) \neq 0$

$f(3) = 0$ ✓ so $(x-3)$ is a factor

$$
\begin{array}{r|l}
 & x^2 + 3x + 1 \\
\hline
x - 3 & x^3 + 0x^2 - 8x - 3 \\
 & x^3 - 3x^2 \\
\hline
 & 3x^2 - 8x \\
 & 3x^2 - 9x \\
\hline
 & x - 3
\end{array}
$$

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

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

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

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

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

or

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

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solve:

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

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

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

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

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

$$0 = (x-3)(x+4)$$

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

$$\emptyset$$