Group Quiz 6
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Math 115

Key

Calculators Allowed

I know not what I appear to the world, but to myself I seem to have been only like a boy playing on the sea-shore, and diverting myself in now and then finding a smoother pebble or a prettier shell, whilest the great ocean of truth lay all undiscovered before me.

Isaac Newton (1643 – 1727)
English physicist and mathematician

1.) Use the Laws of Logarithms to combine $3\ln(x+1)+\frac{1}{5}\left[\ln(x^2-x-1)-2\ln(x-4)\right]$.

$$\ln\left[\frac{(x+1)^3\sqrt[5]{x^2-x-1}}{\sqrt[5]{(x-4)^2}}\right]$$

2.) Analytically, solve $\log_9(x-5)+\log_9(x+3)=1$ for x.

$\Rightarrow \log_9((x-5)(x+3))=1$

$\Rightarrow x^2-2x-15=9$

$\Rightarrow x^2-2x-24=0$

$\Rightarrow (x-6)(x+4)=0$

$x=6$ or $x=-4$

check

$\boxed{x=6}$

3.) The Thanksgiving turkey (possibly made of tofu) comes out of the refrigerator with an internal temperature of $35°F$ and is placed in an oven that has a constant temperature of $325°F$. After 1.5 hours, the internal temperature of the turkey has risen to $103°F$. How long until the turkey is fully cooked (has an internal temperature of $165°F$)? Hint: Newton's Law of Cooling with $D_0=-290$.

$103 = 325 - 290e^{-1.5k}$

$\Rightarrow k \approx 0.1781$

so, solve $165 = 325 - 290e^{-0.1781t}$

$\Rightarrow t \approx 3.339$ hours

OR 3 hours & 20 min.