HW9 solution (Prob 8, 25)

Monday, March 20, 2023 9:31 PM

(8) Expand and simplify

$$\log_{\frac{1}{3}}(9x(y^3-8)) = -\log_3(9x(y^3-8))$$

$$= -\left(\underbrace{\log_3 9}_{=2} + \log_3 x + \log_3(y^3-8)\right)$$

$$= -2 - \log_3 x - \log_3(y^3-8)$$

Factor y^3-8 by noticing that $y=2$ is a root!

2	1	0	0	−8
		2	4	8
	1	2	4	0

$$y^3-8 = (y-2)(y^2+2y+4).$$

$$\log_3(y^3-8) = \log_3(y-2) + \log_3(y^2+2y+4).$$

Therefore,

$$\log_{\frac{1}{3}}(9x(y^3-8)) = -2 - \log_3 x - \log_3(y-2) - \log_3(y^2+2y+4).$$

(25)

$$\log_7 x + \log_7(x-3) - 2$$

$$= \log_7 x + \log_7(x-3) - \log_7 49 = \log_7 \frac{x(x-3)}{49}.$$