Each problem is worth 5 points. For full credit indicate clearly how you reached your answer.

1. Residents of the town of Maple Grove who are connected to the municipal water supply are billed a fixed amount yearly plus a charge for each cubic foot of water used. A household using 1000 cubic feet was billed $90, while one using 1600 cubic feet was billed $105. Write an equation for the total cost of a resident's water as a function of cubic feet of water used.

$(1,000, 90)$

$(1,600, 105)$

$$\frac{105-90}{1600-1000} = \frac{1}{40}$$

$$Y-90 = \frac{1}{40}(x-1,000)$$

$$Y = \frac{1}{40}x - 25 + 90 \quad \text{great}$$

check ✓✓ ☺

$$\boxed{Y = \frac{1}{40}x + 65}$$

2. 13 months ago Jon moved away from Oklahoma, where drinking water often exceeded the 10 parts per billion level regarded as safe for human consumption. If Jon had 0.42mg of arsenic in his body when he moved away, and that amount has been decaying exponentially over the time since he left to a current level of 0.31mg, find a formula for a function that gives the amount of arsenic in Jon's body t months after leaving Oklahoma.

$$A(t) = A \cdot a^t$$

$$A(t) = .42 \cdot a^{13}$$

$$\frac{.31 = .42 \cdot a^{13}}{.42}$$

$$\frac{.31}{.42} = a^{13}$$

$$\left(\frac{.31}{.42}\right)^{1/13} = a$$

$$a = .98$$

$$\boxed{A(t) = .42 \cdot .98^t}$$

$$.42(.98)^{13} \approx .31 \checkmark$$

well done