3.66 Suppose that Y is a random variable with a geometric distribution. Show that

a $\sum_y p(y) = \sum_{y=1}^{\infty} q^{y-1} p = 1$.

b $\dfrac{p(y)}{p(y-1)} = q$, for $y = 2, 3, \ldots$. This ratio is less than 1, implying that the geometric probabilities are monotonically decreasing as a function of y. If Y has a geometric distribution, what value of Y is the most likely (has the highest probability)?

3.76 If Y has a geometric distribution with success probability .3, what is the largest value, y_0, such that $P(Y > y_0) \geq .1$?

the expected daily revenue for the extruder.

*3.142 Let $p(y)$ denote the probability function associated with a Poisson random variable with mean λ.

a Show that the ratio of successive probabilities satisfies $\frac{p(y)}{p(y-1)} = \frac{\lambda}{y}$, for $y = 1, 2, \ldots$.

b For which values of y is $p(y) > p(y-1)$?

c Notice that the result in part (a) implies that Poisson probabilities increase for awhile as y increases and decrease thereafter. Show that $p(y)$ maximized when $y =$ the greatest integer less than or equal to λ.