APMA 1650 Homework 4 Common Mistakes

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1. Most students were able to calculate $m_{Y_n}(t)$ for a fixed n; however a few students made the mistake that $X_n \sim \text{Bi}(n, \frac{1}{2})$. Rather, if $Z_n \sim \text{Bi}(n, \frac{1}{2})$, then X_n is related to Z_n by $X_n = 2Z_n - n$. Most of the mistakes in this problem were made in taking the limit. **The limit of a product is only the product of the limit if both limits exist and are finite.**

2. Nobody recognized this as a Beta distribution. Your first question in solving any problem should be to see if you recognize the distribution. If you had noticed this was $\beta(\alpha = 3, \beta = 5)$, this problem would involve no integration because we could just plug into the formulas for the Beta distribution.

3. Please review calculus if you are rusty: $\int_0^1 e^{tx} dx = \frac{1}{t} e^{tx}|_0^1 = \frac{1}{t}(e^t - 1)$. Pay attention to parenthesis and distribute accordingly.

4. The problem asks for $E[V]$ not $E[R]$. You can do this by finding $E[V]$ directly or by $E[V] = \frac{4\pi}{3} E[R^3]$, but remember that $E[R^3] \neq E[R]^3$.

5. Most people were able to sole this problem geometrically. Students who tried to solve it though cases mainly had algebraic mistakes that lead to the wrong answer.

6. This problem had no common mistakes.