

Problem 6: UConn men's basketball vs. Ivy League opponents

Since the 1980-81 season, UConn men's basketball team has played 31 games against Ivy League opponents. And it has lost only twice: on Dec. 2, 1986 and on Dec. 5, 2014, both to Yale. For some perspectives, here are the relevant stats in a typical matchup:

Random variable	Stands for	Mean	St. Dev.
X	Points scored by UConn per game	75	15
Y	Points scored by Ivy League opponent per game	57	12

Also X and Y are not independent: the correlation between X and Y is $\frac{5}{8}$. Based on this information:

- (a) Show, via an explicit computation, that the standard deviation of $X - Y$ is 12.

[Useful: $12^2 = 144$, $15^2 = 225$.]

- (b) By the central limit theorem, the distribution of $X - Y$ can be approximated by a normal distribution with mean $75 - 57 = 18$ and standard deviation 12. Under this approximation, find $\mathbb{P}[X - Y < 0]$, the probability that UConn loses to an Ivy League opponent in a typical matchup.