# Stat 134: Section 24

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## Problem 1

Here is a summary of Pre-SAT and SAT scores of a large group of students.

| PSAT scores: | average: 1200 | SD: 100 |
|---|---|---|
| SAT scores: | average: 1300 | SD: 90 |
| correlation: 0.6 | | |

Assume the data are approximately bivariate normal in distribution.

a. Of the students who scored 1000 on the PSAT, about what percentage scored above average on the SAT?

b. Of the students who scored below average on the PSAT, about what percentage scored above average on the SAT?

c. About what percentage of students got at least 50 points more on the SAT than on the PSAT?

*Ex 6.5.1 in Pitman's Probability*

## Problem 2

Heights and weights of a large group of people follow a bivariate normal distribution, with correlation 0.75. Of the people in the 90th percentile of weights, about what percentage are above the 90th percentile of heights?

*Ex 6.5.3 in Pitman's Probability*

*Problem 3*

Let $X$ and $Y$ be independent standard normal variables.

a.  For a constant $k$, find $\mathbb{P}(X > kY)$.

b.  If $U = \sqrt{3}X + Y$, and $V = X - \sqrt{3}Y$, find $P(U > kV)$.

c.  Find $\mathbb{P}(U^2 + V^2 < 1)$.

d.  Find the conditional distribution of $X$ given $V = v$.

*Ex 6.5.6 in Pitman's Probability*