P2:

The marks obtained by a number of students for a certain subject are assumed to be approximately normally distributed with mean value 65 and with a standard deviation of 5. If 3 students are selected at random from this set, what is the probability that exactly 2 of them will have marks over 70?

Solution:

Let X denotes marks obtained by a student in a certain subject. Then $X \sim N(65,25)$ and

$$p(x) = P(X > 70) = P\left(Z > \frac{70-65}{5}\right) = P(Z > 1)$$

$$= 0.5 - P(0 < Z < 1)$$

$$= 0.5 - 0.3413 \qquad \text{(Use table)}$$

$$= 0.1587$$

Let Y denote the number of students who got more than 70 marks in a sample of 3 students.

Then $Y \sim B(3, p)$ and $P(Y = 2) = \binom{3}{2}(0.1587)^2(0.8413)$