Answer on question 34208 – Math – Statistics and Probability

Body temp is normally distributed. Average temp is 98.2 with a standard deviation of 0.7.

Suppose that nurse takes the body temp of 10 patients. What is the probability that at least two of the patients have body temps that exceed 98.6.

Solution

Let the random variable X is the body temperature. X is normally distributed.

Let us find the probability that one patient have body temps that exceed 98.6.

$$P(x > 98.6) = 1 - P(x < 98.6) = 1 - \Phi\left(\frac{98.6 - 98.2}{0.7}\right) = 1 - \Phi(0.57) = 0.7843,$$

Where $\Phi(0.57)$ we take from the table http://www.mathsisfun.com/data/standard-normal-distribution-table.html

The probability that at least two of the 10 patients have body temps that exceed 98.6 is

$$P(A) = 1 - P(\{nobody \text{ have body temps that exceed } 98.6\}) -$$

$$-P(\{oly \text{ one patient has body temps that exceed } 98.6\}) =$$

$$= 1 - 0.2157^{10} - C_{10}^1 0.2157^9 * 0.7843 \approx 0.99999.$$

Answer: 0.99999.