Some questions whose answer you ought to know if you intend to take Exam 2

Decide whether each of the following is true or false.

(1) For $i = 1 \cdots n$, let $x_i$ denote independent, normally distributed random variables, each with mean $\mu$ and standard deviation $\sigma$. Then $\overline{x}$ is distributed $N(\mu, \sigma/\sqrt{n})$.

(2) For $i = 1 \cdots n$, let $x_i$ denote independent and identically distributed random variables, each with mean $\mu$ and standard deviation $\sigma$. Then $\overline{x}$ is distributed $N(\mu, \sigma/\sqrt{n})$.

(3) For $i = 1 \cdots n$, let $x_i$ denote independent and identically distributed random variables, each with mean $\mu$ and standard deviation $\sigma$. Then for large $n$, $\overline{x}$ is distributed approximately $N(\mu, \sigma/\sqrt{n})$.

(4) For $i = 1 \cdots n$, let $x_i$ denote independent and identically binary random variables, where each $x_i = 1$ with probability $p$. Then for large $n$, $\overline{x}$ is distributed approximately $N(p, \sqrt{p(1-p)/n})$.

(5) For $i = 1 \cdots n$, let $x_i$ denote independent and identically binary random variables, where each $x_i = 1$ with probability $p$. Then for large $n$, the random variable $x_1 + \cdots + x_n$ is distributed approximately $N(np, \sqrt{np(1-p)})$.

(6) For $i = 1 \cdots n$, let $x_i$ denote independent and identically binomial random variables, each with parameters $m$ and $p$. Then $\overline{x}$ is distributed approximately $N(mp, \sqrt{mp(1-p)/n})$ in the limit as $n \to \infty$.

(7) (This is not true or false.) For $i = 1 \cdots 25$, let $x_i$ denote independent and identically binomial random variables, each with parameters $n = 100$ and $p = 0.25$. What is the approximate probability that $\overline{x} > 26$?