

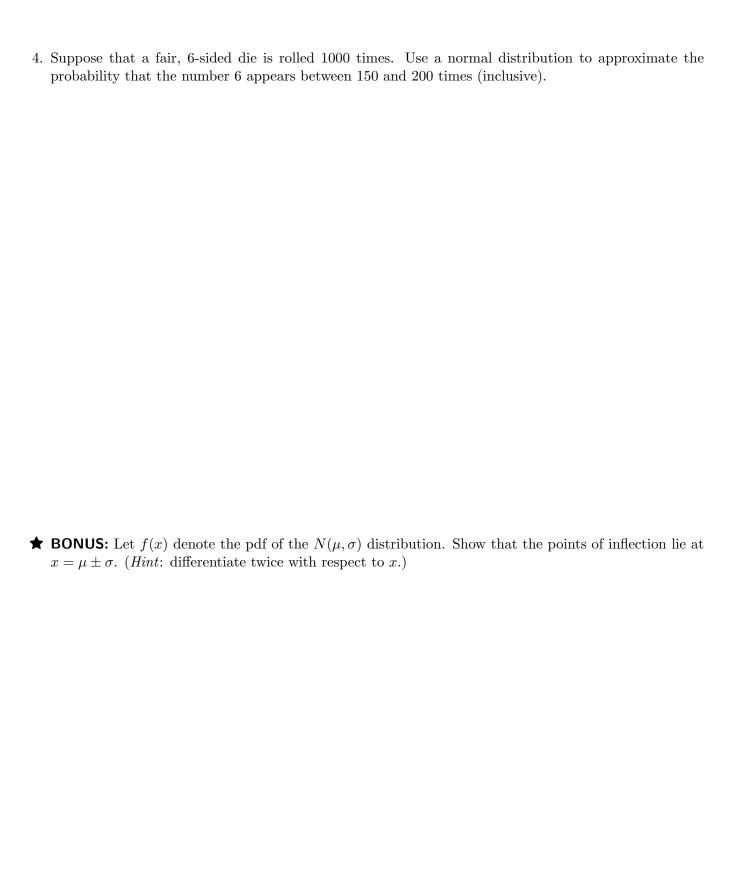
(a) Draw a picture that represents $P(Z \le 0.8)$. Then compute this probability.

(b) Draw a picture that represents $P(Z \le c) = 0.4$. Then find a number c that satisfies this equation.

- 2. Let X be a normal random variable with mean 24 and standard deviation 2.
 - (a) Draw a picture that represents $P(23 \le X \le 25)$. Then compute this probability.

(b) Draw a picture that represents $P(X \ge c) = 0.2$. Then find a number c that satisfies this equation.

3. What is the probability that a normal random variable is within 1.5 standard deviations of its mean?



5. Suppose that emails arrive in your inbox according to a Poisson process with rate 2 emails per hour. Then the time between successive emails is an exponential random variable with mean 30 minutes.
(a) What is the probability that an email arrives in the next 20 minutes?
(b) What is the probability that you don't receive any emails in the next hour?
(c) What is the standard deviation of the time until the next email?
6. Let $X \sim \text{Exp}(\lambda)$ and $0 < a < b$. (a) What is $P(X \ge a)$?
(b) Show that $P(X > b \mid X > a) = P(X > b - a)$.
(c) What other distribution satisfies the equality in (b)?
(d) The property in (h) is special in the same that it described for most render
(d) The property in (b) is special, in the sense that it doesn't hold for most random variables. For example, if $U \sim \text{Unif}[0, 10]$, show that $P(U > 4 \mid U > 3) \neq P(U > 1)$.

7.	What is the moment generating function of an exponential random variable?
8.	Let $X \sim \text{Exp}(1)$. Find a formula for $E(X^n)$ for positive integers n .