The aptitude test scores of applicants to a university graduate program are normally distributed with mean $\mu = 400$ and standard deviation $\sigma = 100$.

1. An applicant needs a test score higher than 525 to be admitted into the graduate program. What proportion of applicants qualify?

2. The university wishes to set the cutoff score for graduate admission so that only the top 8 percent of applicants qualify for admission. What is the required cutoff score?

Solutions:

1. $P(X > 525) = P(Z > (525 - 400)/100) = 1 - 0.8944 = 0.1056$.

2. $P(X > a) = P(Z > (a - 400)/100) = 0.08$, $(a - 400)/100 = 1.405$, so $a = 540.5$. The cutoff should be set at 540 or 541.