

MAT 2379 - Spring 2011
Assignment 3 : Solutions

4.1 (3 points) This question deals with the normal distribution with mean 0, variance 1

(a) $P(-1.5 \leq Z \leq 1.5) = 0.9332 - 0.0668 = 0.8664$

(b) $P(2.5 \leq Z) = 1 - 0.9938 = 0.0062$

(c) $P(|Z| \geq 3.5) = 2P(Z \geq 3.5) = 2(0.0013) = 0.0026$

Note that since for an arbitrary normal X , the variable $Z = \frac{X-\mu}{\sigma}$ has a standard normal, we can also say from part a) $P(\mu - 1.5\sigma \leq X \leq \mu + 1.5\sigma) = 0.8664$.

4.3 (4 points) X has a normal with mean $\mu = 1400$, $\sigma = 100$

(a) $P(X \leq 1500) = P\left(Z \leq \frac{1500-1400}{100}\right) = P(Z \leq 1) = 0.08413$.

All the other exercises are done in a similar manner

(b) 0.6147

(c) 0.7734

(d) 0.2266

(e) 0.2038

(f) 0.2038

4.9 (4 points) X has a normal with mean $\mu = 176$, $\sigma = 30$

(a) $P(X \geq 186) = P\left(Z \geq \frac{186-176}{30}\right) = P\left(Z \geq \frac{1}{3}\right) = 1 - 0.6293 = 0.3707$

All the other exercises are done in a similar manner

(b) 0.2514

(c) 0.9082

(d) 0.9664

(e) 0.2789

(f) 0.2178

(g) 0.3779

4.26 (2 points) Y has a normal with mean $\mu = 1200$, $\sigma = 35$

(a) $P(Y \geq 1250) = P\left(Z \geq \frac{1250-1200}{35}\right) = P\left(Z \geq \frac{50}{35}\right) = 1 - 0.9236 = 0.0764$

All the other exercises are done in a similar manner

(b) 0.2389

(c) 0.8472

(d) 0.1625

4.41(2 points) Y has a normal with mean $\mu = 7.3$, $\sigma = 11.1$

(a) $P(Y \geq 10) = P\left(Z \geq \frac{10-7.3}{11.1}\right) = P(Z \geq 0.24324) = 1 - 0.5948 = 0.4052$

All the other exercises are done in a similar manner

(b) 0.1271

(c) 0.3381

Total= 15 points