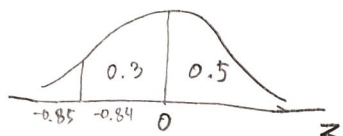5.12 $X \sim N(71, 11^2)$

(1) $P(X \geq 50) = P(z \geq \frac{50-71}{11}) = P(z \geq -1.909) = P(z \leq 1.909)$

$= 0.9719$

$\rightarrow P(0 \leq z \leq 1.91) = 0.4719$ 　　　　　　　　　　　97.19%

(2) $P(X \geq a) = P(z \geq \frac{a-71}{11}) = 0.8$

$P(0 \leq z \leq 0.84) = 0.2995, \quad P(0 \leq z \leq 0.85) = 0.3023$

$\frac{a-71}{11} = -0.84, \quad a = 61.76$

　　　　　　　　　　　　　　　　　　　　　　61.76점

(3) $P(X \geq b) = P(z \geq \frac{b-71}{11}) = 0.1$

$P(0 \leq z \leq 1.28) = 0.3997, \quad P(0 \leq z \leq 1.29) = 0.4015$

$\frac{b-71}{11} = 1.28, \quad b = 85.08$ 　　　85.08점

5.13 $X \sim B(100, 0.5)$

$X \sim N(50, 5^2)$

(a) $P(X \geq 52) = P(z \geq \frac{51.5-50}{5}) = P(z \geq 0.3)$

$= 0.5 - P(0 \leq z \leq 0.3)$

$= 0.5 - 0.1915 = 0.3085$ 　　　　　　0.3085

(b) $P(X < 47) = P(z \leq \frac{46.5-50}{5}) = P(z \leq -0.7) = P(z \geq 0.7)$
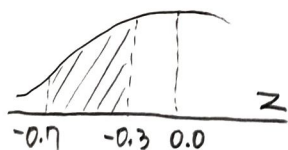
$= 0.5 - P(0 \leq z \leq 0.7)$

$= 0.5 - 0.2580 = 0.242$ 　　　　　0.242

(c) $P(46 < X \leq 48) = P(\frac{46.5-50}{5} < z \leq \frac{48.5-50}{5})$

$= P(-0.7 < z \leq -0.3) = P(0 \leq z \leq 0.7) - P(0 \leq z \leq 0.3)$

$= 0.2580 - 0.1915 = 0.0665$ 　　　0.0665

(d) $P(51 \leq X < 56) = P(\frac{50.5-50}{5} \leq z < \frac{55.5-50}{5})$

$= P(0.1 \leq z < 1.1) = P(0 \leq z < 1.1) - P(0 \leq z \leq 0.1)$

$= 0.3643 - 0.0398 = 0.3245$ 　　　0.3245

6.8 $\mu = 6$ (g), $\sigma = 2.5$ (g) $\qquad \dfrac{\sigma^2}{n} = \dfrac{6.25}{50} = 0.125$

$\bar{X} \sim N(6, 0.125)$

$P(5.75 < \bar{X} < 6.25) = P\left(\dfrac{5.75-6}{\sqrt{0.125}} \leq z \leq \dfrac{6.25-6}{\sqrt{0.125}}\right)$

$\qquad\qquad\qquad\qquad = P(-0.71 \leq z \leq 0.71) = 2 \times P(0 \leq z \leq 0.71)$

$\qquad\qquad\qquad = 0.2611 \times 2 = 0.5222$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad 0.5222$