20170269 강은건 HW

6.4)

$X \sim N(50, 10^2)$

$P(45 < X < 62)$

$= P\left(\frac{45-50}{10} < Z < \frac{62-50}{10}\right)$

$= P(-0.5 \leq Z \leq 1.2)$

$= P(Z < 1.2) - P(Z < -0.5) =$

$0.8849 - 0.3085 = 0.5764.$

6.5)

$X \sim N(300, 50^2)$

$\Rightarrow P(X > 362)$

$\Rightarrow P\left(Z > \frac{362-300}{50}\right) = P(Z > 1.24)$

$= 1 - P(Z < 1.24) = 1 - 0.8925 = 0.1075$

6.6)

$X \sim N(40, 6^2)$

(a) $P(Z < k) = 0.45.$

$P(Z < -0.125) = 0.45.$

$\therefore -0.125 = \frac{X-40}{6}.$

$\therefore X = 39.25.$

(b) $P(Z > k) = 0.14.$

$k = -2.99.$

$-2.99 = \frac{X-40}{6}$

$\therefore X = 22.06.$

6.7)

(a) $P(Z > k) = 0.2946$

$k = 0.54.$

$P(Z < -0.54) = 0.2946$

(b) $P(Z < -1.72) = 0.0427$

$k = -1.72.$

(c) $P(Z < k) - P(Z < 0.93) = 0.7235.$

$P(Z < k) = 0.8997.$

$k = 1.28.$

6.9)

$X \sim N(18, 2.5^2)$

(a) $P(X < 15) = P\left(Z < \frac{15-18}{2.5}\right).$

$= P(Z < -1.2)$

$= 0.1151$

(b) $P(X < -0.76) = 0.2236$

$k = -0.76$

(c) $P(X < -0.91) = 0.1814$

$k = -0.91$

(d) $P(17 < X < 21) = P\left(\frac{17-18}{2.5} < Z < \frac{21-18}{2.5}\right)$

$= P(-0.4 < Z < 1.2)$

$= 0.8849 - 0.3446 = 0.5403.$

6.24) $n=400$ $p=\frac{1}{2}$ $\mu=200$ $\sigma^2=100$.

$X \sim N(200, 10^2)$

(a) $P(185 \le X \le 210)$

$\approx P(184.5 < x < 210.5)$

$= P(-1.55 < z < 1.05)$

$\Rightarrow 0.8531 - 0.0606 = 0.7925$

(b) $P(X=205) \approx P(204.5 \le x \le 205.5)$

$P\left(\frac{204.5-200}{10} \le z \le \frac{205.5-200}{10}\right)$

$= P(0.45 \le z \le 0.55)$

$= 0.7088 - 0.6736 = 0.0352$.

(c) $P(X<176) + P(X>224)$

$P(X<175.5) + P(X>224.5)$

$P(z<-2.45) + P(z>2.75)$

$0.0091 + 0.0030 = 0.0121$

6.34) $n=180$

$P = (1,6)(2,5)(3,4)(4,3)(5,2)(6,1)$

$\Rightarrow \frac{1}{6}$

$X \sim N(30, 5^2)$

(a) $P(x \ge 25) \approx P(x \ge 24.5)$

$\Rightarrow P(z > -1.1)$

$1 - P(z < -1.1) = 0.8643$.

(b) $P(33 \le x \le 41) \approx P(32.5 \le x \le 41.5)$

$\Rightarrow P(0.5 \le z \le 2.5)$.

$= 0.9893 - 0.6915 = 0.2978$.

(c) $P(X=30) \approx P(29.5 \le x \le 30.5)$

$= P(-0.1 \le z \le 0.1) = 0.5398 - 0.4600$

$= 0.0796$.

6.27)

$p = 0.9$ $n = 100$.

$X \sim N(90, 3^2)$.

(a) $P(84 \le x \le 95) \approx P(83.5 \le x \le 95.5)$.

$= P(-2.17 \le z \le 1.83)$

$= 0.9664 - 0.0150 = 0.9514$.

(b) $P(x < 86) \approx P(x < 85.5)$

$= P(z < -1.5) = 0.0668$.

6.28)

$P = \frac{3}{4}$ $n = 80$.

$X \sim N(60, 15)$. ($\sqrt{15}^2$)

(a) $P(x \ge 50) \approx P(x \ge 49.5)$

$P(z \ge -2.01) = 1 - P(z \le -2.01)$

$= 0.9956$

(b) $P(x \le 56) \approx P(x \le 56.5)$

$P(z \le -0.9) = 0.1841$.

6.35) $p = 0.05$, $n = 100$

$X \sim N(5, 4.75)$ $\rightarrow (\sqrt{4.75})^2$

(a) $P(X > 2) \approx P(X > 2.5)$

$P(Z > 1.15) = 1 - P(Z \leq -1.15)$

$= 0.8749.$

(b) $P(X > 10) \approx P(X > 10.5)$

$P(Z > 2.52) = 1 - P(Z < 2.52)$

$= 0.0059.$

6.38) $p = 0.01$ $n = 20$.

(a) $X \sim N(0.2, 0.198)$ $\rightarrow (\sqrt{0.198})^2$.

$P(X > 1) \approx P(X > 1.5)$

$= P(Z > 2.92) = 1 - P(Z < 2.92)$

$= 0.0018.$

(b) $p = 0.01$ $n = 500$

$X \sim N(5, 4.95)$ $\rightarrow (\sqrt{4.95})^2$.

$P(X > 8) \approx P(X > 8.5)$

$= P(Z > 1.50) = 1 - P(Z < 1.50)$

$= 0.0582.$