Opgaver lektion 5

6.3) Find i standard normalfordelingen k, således

a) $P(Z<k) = 0.0427 \Rightarrow \underline{\underline{k = -1,72}}$ ✓

b) $P(Z>k) = 0.2946 \Leftrightarrow P(Z \leq k) = 1 - 0.2946 = 0.7054$

$\Rightarrow \underline{\underline{k = 0.54}}$ ✓

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

$= P(Z<k) - 0.1762$

$= 0.7235$

$\Updownarrow$ $P(Z<k) = 0.8997 \Rightarrow \underline{\underline{k = 1,28}}$ ✓

6.10 $X \sim N(10, 0.03^2)$ X målt i cm

a) $P(X > 10.075) = P\left(\frac{X-10}{0.03} > \frac{10.075-10}{0.03}\right) = P(Z > 2.5) = 1 - P(Z \leq 2.5)$

$= 1 - 0.9938 = 0.0062$

dvs. $\underline{6.2 ‰}$ vil have diameter større end 10.075 cm

b) $P(9.97 < X < 10.03) = P\left(\frac{9.97-10}{0,03} < Z < \frac{10.03-10}{0,03}\right)$

$= P(Z<1) - P(Z<-1) = 0,8413 - 0.1587 = \underline{\underline{0.6826}}$

c) $P(X<k) = 0,15 \Leftrightarrow P\left(\frac{X-10}{0,030} < \frac{k-10}{0,030}\right) = 0.15 \Rightarrow \frac{k-10}{0.03} = -1.04$

$\Leftrightarrow k = 9,9685$

dvs. 15% vil have diameter mindre end $\underline{\underline{9,9685 \text{ cm}}}$

6.13 $Y \sim N(10, 2^2)$ Y: levetid målt i år

$P(Y<k) = 0.03 \Leftrightarrow P\left(Z < \frac{k-10}{2}\right) = 0.03 \Leftrightarrow \frac{k-10}{2} = -1.88$

$\Leftrightarrow k = 6.24$

dvs. hvis han kun vil udskifte $\overset{max}{3}$ % skal han kun give garanti i $\underline{6.24 \text{ år}}$. ✓

Opgaver lektion 5

6.22 X : ventetid $\quad 0 \le x < 10 \quad f(x) = \begin{cases} \frac{1}{10} & 0 \le x \le 10 \\ 0 & \text{ellers} \end{cases}$

a) $P(X \ge 7) = \int_7^{10} \frac{1}{10}\,dx = \frac{1}{10}[x]_7^{10} = \frac{1}{10}[10-7] = \underline{\underline{\frac{3}{10}}}$

b) $P(2 \le X \le 7) = \int_2^{7} \frac{1}{10}\,dx = \frac{1}{10}[x]_2^{7} = \frac{5}{10} = \underline{\underline{\frac{1}{2}}}$

6.62 A : $X \sim N(14.000,\ 2.000^2)$

B : $Y \sim N(13.000,\ 1.000^2)$

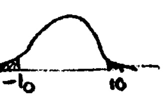
defekte hvis $X < 10.000$ eller $Y < 10.000$

$P(X < 10.000) = P\left(Z < \frac{10.000 - 14.000}{2.000}\right) = P(Z < -2) = 0.0228$

$P(Y < 10.000) = P\left(Z < \frac{10.000 - 13.000}{1.000}\right) = P(Z < -3) = 0.0013$

Dvs B producerer sandsynligvis færre defekte enheder end A.

6.68 $X \sim N(0, 4^2)$ afstand til mål, fejler hvis $|X| > 10$ feet



$P(|X| > 10) = P(X < -10) + P(X > 10) = P(Z < -2.5) + P(Z > 2.5)$

$= 0.0062 + 0.0062 = 0.0124$

$P(Z > 2.5) = P(Z < -2.5)$