

b.3) Find i standard normalfordelingen k , således

a) $P(Z < k) = 0.0427 \Rightarrow \underline{k = -1.72} \checkmark$

b) $P(Z > k) = 0.2946 \Leftrightarrow P(Z \leq k) = 1 - 0.2946 = 0.7054$
 $\Rightarrow \underline{k = 0.54} \checkmark$

c) $P(-0.93 < Z < k) = P(Z < k) - P(Z < -0.93)$
 $= P(Z < k) - 0.1762$
 $= 0.7235$

① $P(Z < k) = 0.8997 \Rightarrow \underline{k = 1.28} \checkmark$

b.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. 0.2 % vil have diameter større end 10.075 cm

b) $P(9.97 < X < 10.03) = P\left(\frac{9.97-10}{0.03} < Z < \frac{10.03-10}{0.03}\right)$
 $= P(Z < 1) - P(Z < -1) = 0.8413 - 0.1587 = \underline{0.6826}$

c) $P(X < k) = 0.15 \Leftrightarrow P\left(\frac{X-10}{0.03} < \frac{k-10}{0.03}\right) = 0.15 \Rightarrow \frac{k-10}{0.03} = -1.04$
 $\Leftrightarrow k = 9.9685$

dvs. 15% vil have diameter mindre end 9.9685 cm

b.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 man kun vil udskifte ^{max} 3% skal man kun give garanti i 6.24 år. \checkmark

Opgaver lektion 5

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

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

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

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 $Y < 10.000$

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

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

Der B produceres sandsynligvis færre defekte enheder end A.

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

$P(|X| > 10) = P(X < -10) + P(X > 10) = P(Z < -2.5) + P(Z > 2.5)$
 $= 0.0062 + 0.0062 = 0.0124$ $P(Z < -2.5)$

