Øving 10

4.3.2 (a) $P(0 \le Z \le 2.07) = P(Z \le 2.07) - P(Z \le 0)$

$= 0.9808 - 0.5000$

$= 0.4808$

(b) $P(-0.64 \le Z < -0.11) = P(Z \le -0.11) - P(Z \le -0.64)$

$= 0.4562 - 0.2611$

$= 0.1951$

(c) $P(Z > -1.06) = 1 - P(Z \le -1.06)$

$= 1 - 0.1446$

$= 0.8554$

(d) $P(Z < -2.33) = P(Z \le -2.33)$

$= 0.0099$

(e) $P(Z \ge 4.61) = 1 - P(Z \le 4.61)$

$= 1 - 1$

$= 0$

4.3.5 (a) $P(Z \le z) = 0.33 \Rightarrow z = -0.44$

(b) $P(Z \ge z) = 0.2236$

$P(Z \le z) = 1 - 0.2236 = 0.7764 \Rightarrow z = 0.76$

(c) $P(-1.00 \le Z \le z) = 0.5004$

$P(Z \le z) = 0.5004 + P(Z \le -1.00)$

$= 0.5004 + 0.1587$

$= 0.5004 + 0.1587$

$= 0.6591 \Rightarrow z = 0.41$

(d) $P(-z < Z < z) = 0.80$

$P(Z \le z) - P(Z \le -z) = P(Z \le z) - P(Z \ge z)$

$= P(Z \le z) - 1 + P(Z \le z)$

$= 2P(Z \le z) - 1$

$= 0.80$

$P(Z \le z) = 0.9 \Rightarrow z \approx 1.28$

(e) $P(z \le Z \le 2.03) = 0.15$

$P(Z \le 2.03) - P(Z \le z) = 0.15$

$P(Z \le z) = P(Z \le 2.03) - 0.15$

$= 0.9788 - 0.15$

$= 0.8288 \Rightarrow z = 0.95$

4.3.30 $P(103.5 \le Z \le 144.5) = 0.80$

$\mu = \frac{103.5 + 144.5}{2}$

$= 124$

$P(-z \le Z \le z) = 0.80$

$\Rightarrow z = 1.28$

4.4.2 $p = 0.10$

$P(X = k) = (1-p)^{k-1} p$

$P(1) = P(X = 1)$

$P(X=2) = (1-p)\,p$

$p_X(b) = P(X=b)$

$= 0.90^{b-1} \cdot 0.1$

$E[X] = \mu$

$= \frac{1}{p}$

$= \frac{1}{0.10}$

$= 10$

Han trenger 10 forsøk

4.5.1

Eksamen Vår 2013

1. $\mu = 230$

$\sigma^2 = 625$

(a) $P(Z \leq 165) = \int_0^{165} \frac{1}{\sqrt{2\pi}} \cdot \frac{1}{25} \cdot e^{-\frac{1}{2}\left(\frac{x-230}{25}\right)^2} dx$

$= \left[u = \frac{x-230}{25} \right.$

$\left. dx = 25\,du \right]$

$= \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{-2.6} e^{-\frac{u^2}{2}} du$

≈ 0.00465

$P(165 \leq Z \leq 170) = \frac{1}{\sqrt{2\pi}} \int_{-2.6}^{-2.4} e^{-\frac{u^2}{2}} du$

≈ 0.00353

$\Rightarrow P(Z \geq 170) = 1 - 0.00465 - 0.00353$

≈ 0.99

(a)

≈ 0.99

(b)

3.12.5(a) $M_Y(t) = e^{6t^2}$

$M_Y(t) = e^{\mu t + \sigma^2 \frac{t^2}{2}}$

Normal fordeling med $\mu = 0$ og $\sigma^2 = 12$

(b) $M_Y(t) = \frac{2}{2-t}$

$M_Y(t) = \frac{\lambda}{\lambda - t}$

Eksponential fordeling med $\lambda = 2$

(c) $M_X(t) = \left(\frac{1}{2} + \frac{1}{2}e^t\right)^4$

$M_X(t) = (1 - p + pe^t)^n$

Binomial fordeling med $p = \frac{1}{2}$ og $n = 4$

(d) $M_X(t) = \frac{0.3e^t}{1 - 0.7e^t}$

$M_X(t) = \frac{pe^t}{1 - (1-p)e^t}$

Geometrisk fordeling med $p = 0.3$

3.12.9 $M_Y(t) = e^{\frac{t^2}{2}}$

$E[Y^3] = M_Y^{(3)}(0)$

$M_Y'(t) = te^{\frac{t^2}{2}}$

$M_Y''(t) = e^{\frac{t^2}{2}} + t^2 e^{\frac{t^2}{2}}$

$M_Y^{(3)}(t) = te^{\frac{t^2}{2}} + 2te^{\frac{t^2}{2}} + t^3 e^{\frac{t^2}{2}}$

$E[Y^3] = M_Y^{(3)}(0) = 0$

4.3.34