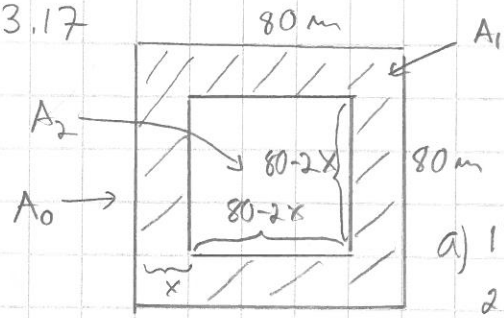
$$x^2 - \frac{20}{3}x + \frac{100}{9}$$

$$= \int_0^{10} \left(-\frac{x^3}{50} + \frac{x^2}{3} - \frac{14}{9}x + \frac{20}{9} \right) dx = \ldots = \frac{50}{9}$$

$$D\underline{x} = \sqrt{\frac{50}{9}} = \frac{5\sqrt{2}}{3} \approx 2{,}36 \text{ (cm)} \quad \text{(keskihajonta)}$$

13.17



$\underline{X}$: sormussen etäisyys lähimmästä reunasta (m)
$(0 \ldots 40)$

a) 1° $x \le 0$: $F(x) = P(\underline{X} \le x) = 0$

2° $x \ge 40$: $F(x) = P(\underline{X} \le x) = 1$

3° $0 < x < 40$: $F(x) = P(\underline{X} \le x) \overset{\text{geom. tn}}{=} \frac{A_1}{A_0} = \frac{A_0 - A_2}{A_0}$

$$= \frac{A_0}{A_0} - \frac{A_2}{A_0} = 1 - k^2 = 1 - \frac{(80-2x)^2}{80^2}$$

$$= 1 - \frac{6400 - 320x + 4x^2}{6400} = 1 - \left(1 - \frac{1}{20}x + \frac{1}{1600}x^2\right)$$

$$= \frac{1}{20}x - \frac{1}{1600}x^2$$

1°-3° $\Rightarrow$ $F(x) = \begin{cases} 0, & x \le 0 \\ \frac{1}{20}x - \frac{1}{1600}x^2, & 0 < x < 40 \\ 1, & x \ge 40 \end{cases}$ (kertymäfunktio)

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b) $f(x) = F'(x) = \begin{cases} \frac{1}{20} - \frac{1}{800}x, & 0 < x < 40 \\ 0, & \text{muualla} \end{cases}$ (tiheysfunktio)

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c) $E(\underline{X}) = \int_{-\infty}^{\infty} x f(x)\,dx = \underbrace{\int_{-\infty}^{0} x \cdot 0\,dx}_{=0} + \int_0^{40} x \cdot \left(\frac{1}{20} - \frac{1}{800}x\right) dx + \underbrace{\int_{40}^{\infty} x \cdot 0\,dx}_{=0}$

$$= \ldots = \frac{40}{3} \approx 13{,}3 \text{ (m)}$$

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d) $P(\underline{X} \ge 35) = \int_{35}^{\infty} f(x)\,dx = \int_{35}^{40} \left(\frac{1}{20} - \frac{1}{800}x\right) dx = \ldots$

TAI: $P(\underline{X} \ge 35) = 1 - P(\underline{X} \le 35) = 1 - F(35)$

$$= 1 - \left(\frac{1}{20} \cdot 35 - \frac{1}{800} \cdot 35^2\right) = \frac{1}{64} \approx 0{,}0156$$