

statistiek

I klassebreedte $\frac{50-0}{\sqrt{55}} = 6,74 \rightarrow 7$

klasse	freq.	cum. freq.	rel. freq.
[0, 6]	8	8	0,1455
[7, 13]	15	23	0,2909
[14, 20]	6	29	0,1091
[21, 27]	7	36	0,1273
[28, 34]	9	45	0,1636
[35, 41]	3	48	0,0545
[42, 48]	3	51	0,0545
[49, 55]	3	54	0,0545

$$\sum x_i = 1123, \quad \sum x_i^2 = 33509$$

$$\bar{x} = \frac{1123}{55} = 20,418182$$

$$s^2 = \frac{1}{54} \left[33509 - \frac{(1123)^2}{55} \right] = 195,9144781$$

II a) $P(3 \text{ A's}) = \frac{4}{52} \cdot \frac{3}{51} \cdot \frac{2}{50} = \frac{\binom{4}{3}}{\binom{52}{3}} = 0,000180995475$

b) $P(4 \text{ hanten} + 3 \text{ schoppen}) = \frac{\binom{13}{4} \binom{13}{3}}{\binom{52}{7}} = 0,001528502243$

c) $P(4 \text{ hanten}) = \frac{\binom{13}{4}}{\binom{52}{4}} = 0,002641056423$

$P(3 \text{ hanten}) = \frac{\binom{13}{3} \binom{39}{1}}{\binom{52}{4}} = 0,04120048$

$P(2 \text{ hanten}) = \frac{\binom{13}{2} \binom{39}{2}}{\binom{52}{4}} = 0,213493397$

$P(0 \text{ of } 1 \text{ hanten}) = \frac{\binom{39}{4}}{\binom{52}{4}} + \frac{\binom{13}{1} \binom{39}{3}}{\binom{52}{4}} = 0,742665066$

$U_{\text{Winst}} = \{45, 20, 5, -5\}$

$E_{\text{Winst}} = 45 \cdot P(4 \text{ hanten}) + 20 \cdot P(3 \text{ hanten}) + 5 \cdot P(2 \text{ hanten}) - 5 \cdot P(0 \text{ of } 1 \text{ hanten})$
 $= -1,703001206$

III (a) $X = \text{aantal aanrijdingen per week op het kruispunt}$
 $X \sim PS(\lambda = 0,45)$

$P(X > 1) = 1 - P(X \leq 1) = 1 - 0,7541 = 0,2459$

(b) $Y = \text{aantal weken met meer dan 1 aanrijding}$
 $Y \sim BN(n=10, p=0,2459)$

$P(Y=5) = \binom{10}{5} (0,2459)^5 (0,7541)^5 = 0,055250713$

BN-tabel $P(Y=5) \stackrel{p=0,25}{=} 0,9803 - 0,9219 = 0,0584$

IV

$X = \text{autosnelheid}$, $X \sim N(\mu, \sigma^2)$
 steekproef $n=20$, $\bar{X} = 57 \text{ km/u}$, $S = 5 \text{ km/u}$

a) $H_0: \mu \leq 50$

$H_1: \mu > 50$, $\alpha = 0.05$

$R_2 = 50 + 1.729 \times \frac{5}{\sqrt{20}} = 51.93$, $\bar{X} = 57 > R_2$, H_0 verwerpen

of $\frac{\sqrt{n}(\bar{X} - \mu_0)}{S} = \frac{\sqrt{20}(57 - 50)}{5} = 6.26 > t_{0.05}(19) = 1.729$ dus \rightarrow

b) $57 - 2.093 \cdot \frac{5}{\sqrt{20}} < \mu < 57 + 2.093 \cdot \frac{5}{\sqrt{20}}$
 $54.66 < \mu < 59.34$

c) $H_0: \sigma^2 = 9$

$H_1: \sigma^2 \neq 9$, $\alpha = 0.10$

$R_1 = \frac{\chi_{19}^2(0.95)}{9} = \frac{(10.117)}{9} = 1.124$; $R_2 = \frac{\chi_{19}^2(0.05)}{9} = \frac{(30.144)}{9} = 3.349$

$S^2 = 25 > R_2$ dus H_0 verwerpen

of $\frac{(n-1)S^2}{\sigma_0^2} = \frac{19 \times 25}{9} = 52.78 > \chi_{0.05}^2(19) = 30.144$ dus \rightarrow

V $X \sim N(\mu_X = 10, \sigma_X^2 = 1)$ en $Y \sim N(\mu_Y = 15, \sigma_Y^2 = 4)$

a) $Y - X \sim N(\mu = 15 - 10 = 5, \sigma^2 = 4 + 1 = 5)$

b) $S = X_1 + \dots + X_{20} \sim N(\mu_S = 20 \times 10 = 200, \sigma_S^2 = 20 \times 1 = 20)$

VI

afhank. variabele $y = \text{productie draag padde}$
 onafhank. variabele $x = \text{beplant. areaal}$

$y = a + bx$

x_i	y_i	x_i^2	y_i^2	$x_i y_i$
40	157	1600	24649	6280
54	193	2916	37249	10462
49	174	2401	30276	8526
76	164	5776	26896	12464
44	198	1936	39204	8712

$\Sigma: 233$ 886 10969 158274 41484

$b = \frac{41484 - \frac{(233)(886)}{5}}{10969 - \frac{(233)^2}{5}}$

$= \frac{196.4}{111.2} = 1.76618705$

$a = \frac{886}{5} - b \cdot \frac{233}{5} = 94.89568346$

$r_{xy} = \frac{196.4}{\sqrt{111.2} \cdot \sqrt{1274.8}} = 0.521636608$

matige lineaire samenhang.