

HTS-Abschluss 2008

8. a) $2 \cdot 16! \approx 4.18 \cdot 10^{13} \approx \underline{41.8 \text{ Bio.}}$

b) $\binom{10}{3} = \underline{120}$

c) $\binom{24}{18} \cdot 18! = \frac{24!}{6!} \approx 8.61 \cdot 10^{20} \approx \underline{861 \text{ Trio.}}$

d) Satz der totalen W'keit: $\frac{9}{16} \cdot \frac{2}{3} + \frac{7}{16} \cdot \frac{1}{2} = \frac{19}{32} \approx \underline{59.4\%}$

9. a) $X = \text{Anzahl gewonnener Spiele} \sim \text{Bin}(9, \frac{1}{4})$

$P[X \geq 5] = 1 - P[X \leq 4] \approx 1 - 0.951 \approx \underline{4.89\%}$

b) $Y = \text{Anzahl gewonnener Turniere}$

$P[Y \geq 1] = 1 - P[Y = 0] \approx 1 - 0.951^4 \approx \underline{18.2\%}$

c) $T = \text{Anzahl Siege} \sim \text{Bin}(25, p)$

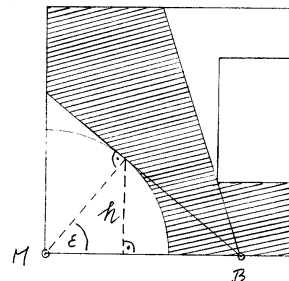
$H_0: p = \frac{1}{4}; H_A: p > \frac{1}{4} \text{ (einseitig)}$

$P\text{-Wert} = P_{H_0}[T \geq 13] = 1 - P_{H_0}[T \leq 12] \approx 1 - 0.99663 \approx \underline{0.337\%}$

Entscheidung: H_0 wird verworfen!

(Die Daten belegen, dass Evelines Gewinnw'keit gestiegen ist.)

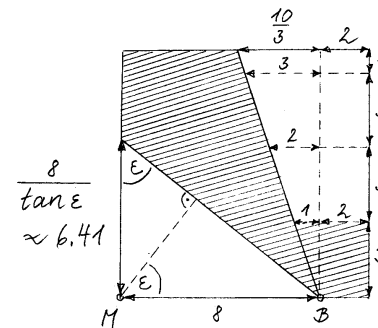
10. a)



b) $\epsilon = \arccos \frac{5}{8} \approx 51.3^\circ$

$h = 5 \sin \epsilon \approx 3.90$

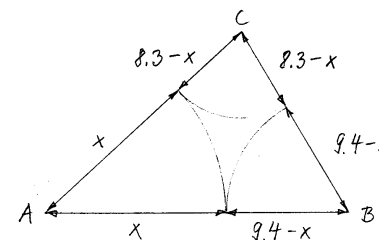
$A_{\triangle} = \frac{1}{2} \cdot 8 \cdot h - 5^2 \pi \frac{\epsilon}{360^\circ} \approx 4.42$



$A_{\triangle} = 100 - \frac{1}{2} \cdot 8 \cdot \frac{8}{\tan \epsilon} - \frac{3 + \frac{16}{8}}{2} \cdot 7 \approx 100 - 25.6 - 29.2 \approx 45.2$

$A_{\text{Blickfeld}} \approx 4.42 + 45.2 \approx \underline{49.6}$

11.



$8.3 - x + 9.4 - x = 6.5$
 $2x = 11.2$
 $x = 5.6$
 $9.4 - x = 3.8$
 $8.3 - x = 2.7$

$\alpha = \arccos \frac{8.3^2 + 9.4^2 - 6.5^2}{2 \cdot 8.3 \cdot 9.4} \approx 42.5^\circ$

$\beta = \arccos \frac{6.5^2 + 9.4^2 - 8.3^2}{2 \cdot 6.5 \cdot 9.4} \approx 59.7^\circ$

$\gamma \approx 180^\circ - 42.5^\circ - 59.7^\circ \approx 77.8^\circ$

$h_c \approx 8.3 \cdot \sin 42.5^\circ \approx 5.61$

$A_{\triangle} \approx \frac{1}{2} \cdot 9.4 \cdot 5.61 \approx 26.4$

$A \approx 26.4 - 5.6^2 \pi \frac{42.5^\circ}{360^\circ} - 3.8^2 \pi \frac{59.7^\circ}{360^\circ} - 2.7^2 \pi \frac{77.8^\circ}{360^\circ} \approx 26.4 - 11.6 - 7.52 - 4.95 \approx \underline{2.26 \text{ cm}^2}$