

BINOMIJAKAUMA

esim1 5-lapinen perhe

$X = \text{"tyttöjen lkm"}$
 Muodosta jakauma, tee kuvaaja, laske odotusarvo

tristoke, suoritetaan n kertaa
 olkoon tapahtuman A tod. näk.
 yhden kokeen p .

$P(A) = p \qquad P(\bar{A}) = 1 - p = q$

$\underline{X} = \text{"A:n esiintymiskertojen lkm"}$
 Tod. näk. laskeminen kaavasta

$P(X = k) = \binom{n}{k} \cdot p^k \cdot q^{n-k}$



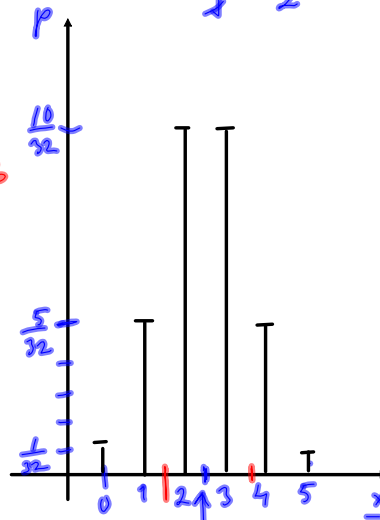
odotusarvo: $E(X) = n \cdot p$

keskihajonta: $D(X) = \sqrt{n \cdot p \cdot q}$

$$p = \frac{1}{2}$$

$$q = \frac{1}{2}$$

$X=k$	$P(X=k)$
0	$\left(\frac{1}{2}\right)^5 = \frac{1}{32} \approx 0,031$
1	$\binom{5}{1} \left(\frac{1}{2}\right)^1 \cdot \left(\frac{1}{2}\right)^4 = \frac{5}{32} \approx 0,156$
2	$\binom{5}{2} \left(\frac{1}{2}\right)^2 \cdot \left(\frac{1}{2}\right)^3 = \frac{10}{32} \approx 0,313$
3	$\binom{5}{3} \left(\frac{1}{2}\right)^3 \cdot \left(\frac{1}{2}\right)^2 = \frac{10}{32} \approx 0,313$
4	$\binom{5}{4} \left(\frac{1}{2}\right)^4 \cdot \left(\frac{1}{2}\right)^1 = \frac{5}{32} \approx 0,156$
5	$\left(\frac{1}{2}\right)^5 = \frac{1}{32} \approx 0,031$



$$E(X) = n \cdot p = 5 \cdot \frac{1}{2} = \frac{5}{2} = 2\frac{1}{2}$$

$$D(X) = \sqrt{n \cdot p \cdot q} = \sqrt{5 \cdot \frac{1}{2} \cdot \frac{1}{2}} = \frac{\sqrt{5}}{2} \approx 1,118 \approx \underline{1,1}$$

keskihaj.

$$2,5 + 1,1 = 3,6$$

$$2,5 - 1,1 = 1,4$$