Hölder $|\mathbb{E}XY| \le \mathbb{E}|XY| \le (\mathbb{E}|X|^p)^{1/p} \cdot (\mathbb{E}|Y|^q)^{1/q}$ $\left(\frac{1}{p}a^p + \frac{1}{q}b^q \ge ab, \ \frac{1}{p}+\frac{1}{q}=1\right)$

Cauchy Schwarz & Covariance Ineq $\Leftarrow$ $(p,q=2)$ $\mathbb{E}(g(X)h(X)) \le \mathbb{E}g(X)\,h(X)$ $\uparrow\downarrow$

$\ge$ $\uparrow\uparrow$ or $\downarrow\downarrow$

Minkowski $(\mathbb{E}|X+Y|^p)^{1/p} \le (\mathbb{E}|X|^p)^{1/p} + (\mathbb{E}|Y|^p)^{1/p}$ $p \ge 1$

Jensen $\mathbb{E}g(X) \ge g(\mathbb{E}X)$ g convex $M_H \le M_G \le M_A \le M_Q \le$ Norm $(p>2)$

Chebyshev $r P(\varphi(X) \ge r) \le \mathbb{E}\varphi(X)$ $P(|X-\mathbb{E}X| \ge \varepsilon) \le \frac{\mathrm{Var}X}{\varepsilon^2}$ $\mathbb{E}e^{tX}$

By integrating the tails of any dist / By MGF: $P(|X| \ge a) \le e^{-at} M_X(t)$

$X \sim$ Poisson(λ): $P(X=x+1) = \frac{\lambda}{x+1} P(X=x)$