

Solutions to HW11

#1 $X =$ price of stock.

Chebyshev's inequality: $P(|X - \mu| \geq k) \leq \frac{\sigma^2}{k^2}$

these numbers change

#2 $X =$ # words, $Y =$ # emojis.

$P(X \geq a, Y \geq b) \stackrel{\text{indep}}{=} P(X \geq a)P(Y \geq b) \stackrel{\text{Markov}}{\leq} \frac{E(X)}{a} \frac{E(Y)}{b}$

All numbers change.

#3.

$X \sim$ Normal (μ, σ^2)

$Y \sim$ Exponential (λ)

$M_{X+Y}(t) \stackrel{\text{indep}}{=} M_X(t) \cdot M_Y(t) = e^{t\mu + \frac{t^2\sigma^2}{2}} \cdot \frac{\lambda}{\lambda - t}$

$M_{X+Y}(4) = \frac{\lambda e^{4\mu + 8\sigma^2}}{\lambda - 4}$

These numbers change.