The Last of Binomial Distribution

EX. 2% of students at a large school love poetry. What is the largest sample of students for which the probability is > 0.5 that <u>no one</u> in the group loves poetry?

X = number of students who love poetry (in the sample)

$X \sim B(n, 0.02)$ $\qquad$ $\boxed{n = 34}$ largest sample size

$P(X = 0) > 0.5$

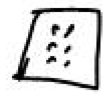
EX How many times must you roll a die so that the probability of <u>at least one</u> ⚅ ≥ 0.99 ?

$1 - P(\text{no ⚅})$

$= 1 - \text{binomialpdf}(X, 1/6, 0)$

Expected Value

Ex. Roll a die 100 times.

X = number of 

The expected value is $E(X) = \frac{1}{6}(100) = 16\frac{2}{3}$

$\text{mean} = \mu = 16\frac{2}{3}$

$$\boxed{E(X) = np}$$

Variance (a measure of spread)

$$\boxed{\sigma^2 = Var(X) = npq}$$

$$\sigma^2 = Var(X) = 100\left(\frac{1}{6}\right)\left(\frac{5}{6}\right) = \frac{500}{36}$$

$$= 13.9$$

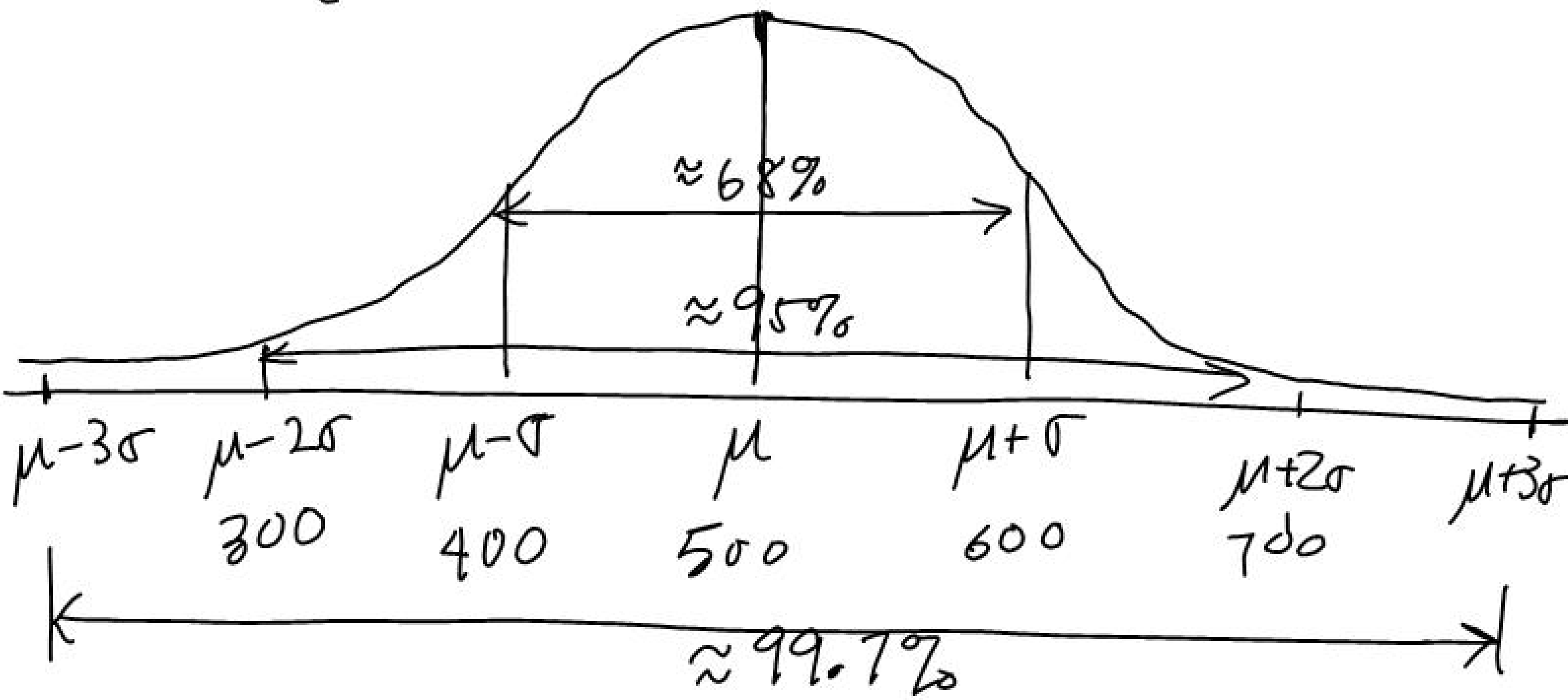
σ = the standard deviation

$$\sigma = \sqrt{\frac{500}{36}} = 3.73$$

$$12.9 \longleftarrow 16\tfrac{2}{3} \longrightarrow 20.4$$

The Normal Distribution

(a continuous distribution)



SAT-Math

$$\boxed{X \sim N(500, 100^2)}$$

μ variance

Ex. $P(X > \underline{620}) = P(Z > 1.2) = 0.115$

Z-score (number of std. dev. above or below the mean.)

$$* \boxed{Z = \frac{x - \mu}{\sigma}} \qquad z = \frac{620 - 500}{100} = 1.2$$

Ex (SAT-M)

$$P(370 < X < 550) = P(-1.3 < Z < 0.5)$$

$$= \text{normalcdf}(-1.3, 0.5)$$

$$z = \frac{370 - 500}{100} = -1.3 \qquad z = \frac{550 - 500}{100} = 0.5 \qquad = 0.595$$

15J

~~#1~~

X = Euros spent per week on food

$X \sim N(100, 20^2)$

(a) $P(X \leq 130) = P(Z \leq 1.5) = 0.933$

$$z = \frac{130 - 100}{20} = 1.5 \qquad \text{normalcdf}(-9, 1.5)$$

HW

15E #2, 4, 5

15F #1

15G #2, 4, 5

15J #2, 3, 4