15 E $X \sim B(n, 0.6)$

$P(X < 1) = 0.0256 = P(X = 0)$

$\boxed{n = 4}$

#2 X = # of faulty fuses

$X \sim B(n, 0.01)$

$P(X = 0) > 0.5$

$\boxed{n = 68}$

X = # of tails

#5 $1 - P(X = 0)$

$1 -$ binomialpdf $(X, 1/2, 0)$

or $1 - (\frac{1}{2})^{\wedge} X$

15G #2. $B(12, 0.6)$

$\mu = E(X) = np$

$\sigma^2 = Var(X) = npq$

Memorize

$\mu = (12)(0.6) = 7.2$

$\sigma^2 = (12)(0.6)(0.4) = 2.88$

Std. dev. $= \sigma = \sqrt{2.88} = 1.70$

#4. $X \sim B(10, 1/6)$

(a) $E(X) = (10)(\frac{1}{6}) = 5/3 = 1\ 2/3$

(b) $Var(X) = (10)(\frac{1}{6})(\frac{5}{6}) = \frac{25}{18}$

(c) $P(X < \mu) = P(X < 5/3) =$ binomial cdf $(10, 1/6, 5/3)$

$= P(X \leq 1) =$ binomial cdf $(10, 1/6, 1)$

15J #2 X = diameter of a bolt.

$X \sim N(4, 0.25^2)$

$P(3.5 < X < 4.5) = P(-2 < z < 2)$

$= 0.954$

$z = \frac{x - \mu}{\sigma}$

$z = \frac{3.5 - 4}{0.25} = -2$

$z = \frac{4.5 - 4}{0.25} = 2$

$0.954(500)$

$= 477$ bolts

#2½ Find the minimum diameter of a bolt in to top 10% of diameters.

90th percentile or better

$z = \text{invnorm}(0.90) = 1.282 = \frac{x - 4}{0.25}$

$x = 4.32$ mm

Find the maximum diameter of a bolt in the bottom 20% of diameters.

↳ 20th percentile

$$z = \text{invnorm}(0.20) = -0.8416 = \frac{x - 4}{0.25}$$

$$\boxed{x = 3.79 \text{ mm}}$$

15L #4. X = mass of a lettuce head

$$X \sim N(550, 25^2)$$

(μ = 550, var = 25^2)

(a) $P(520 < X < 570) = P(-1.2 < z < 0.8)$

$= \text{normalcdf}(-1.2, 0.8)$

$= 0.673$

$$z = \frac{520 - 550}{25} = -1.2$$

$$z = \frac{570 - 550}{25} = 0.8$$

4b $z = \text{invnorm}(0.90) = 1.282$

$$1.282 = \frac{x - 550}{25}$$

$$\boxed{x = 582\text{ g}}$$

Ex. Rutabagas have a mean weight of 32 oz. 15% of rutabagas weigh over 39 oz. Find σ.

$z = \text{invnorm}(0.85) = 1.036 = \dfrac{39 - 32}{\sigma}$

$$\sigma = \frac{39 - 32}{1.036}$$

$$\boxed{\sigma = 6.75\text{ oz.}}$$

Ex. • 12% of cabbages weigh 14oz or less

• 5% of cabbages weigh 24oz or more

Find the mean (μ) and standard deviation (σ) of the weights.

$z = \text{invnorm}(0.12) = -1.175 = \frac{14 - \mu}{\sigma}$

$z = \text{invnorm}(0.95) = 1.645 = \frac{24 - \mu}{\sigma}$

Subtr: $\begin{cases} -1.175\sigma + \mu = 14 \\ 1.645\sigma + \mu = 24 \end{cases}$

$-2.82\sigma = -10$

$\boxed{\sigma = 3.55 \text{ oz}}$

$1.645(3.55) + \mu = 24$

$\boxed{\mu = 18.2 \text{ oz}}$

HW | 15J | #5 | 15M | #5, 7, 9, 10