1. If X - B(n, 0.6) and P(X<1)=0.0256, find n.

$B(n, \underset{0.6}{p}) = \binom{n}{0} p^r (1-p)^{n-r}$ $(x+3)^n$

$= \binom{n}{0} (0.6)^0 (1-0.6)^{n-0} = 0.0256$

$\frac{n!}{1\ 0!\,(n!)}$

$(1)(1)(0.4)^n = 0.0256$

$n \ln(.4) = \ln 0.0256$

$n = \frac{\ln 0.0256}{\ln(.4)} \approx 4$

$P(x) = 0.3$

find least # of attempts > 0.95

Let X be a goal

$X \sim B(n, 0.3)$

$P(X \geq 1) = 1 - P(X=0)^n$

$\therefore 1 - (.7)^n > 0.95$

$-(.7)^n > -.05$

$.7^n < .05$

$n < \frac{\ln 0.05}{\ln 0.70}$

$n < 8.4$

9 goals or more

EXPECTATION OF A BINOMIAL DISTRIBUTION

- flipping a fair coin 30 times: how many Heads do you expect?

$$\boxed{\text{FOR BINOM DIST WHERE } X \sim B(n,p) \text{ THE EXPECTATION OF } x,\ E(x) = np}$$

Ex) Biased die thrown 30 times with 6 showing up 8 times. If we throw die 12 times, what's the expected value of 6s?

$n = 12 \quad p = \frac{8}{30} = \frac{4}{15}$

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$$E(x) = np$$
$$= 12\left(\frac{4}{15}\right) \approx 3.2$$

Expect 3 6's

VARIANCE OF BINOM DIST

- Recall σ^2 = variance – tells us how widely data is spread out

  $\sqrt{\sigma^2}$ = std dev.

$$\boxed{\text{IF } X \sim B(n,p) \text{ THEN } VAR(X) = npq \quad \text{WHERE } q = 1-p}$$

Ex) Recall our biased coin:

$P(H) = \frac{2}{3}$ $\quad P(H') = \frac{1}{3}$ $\quad n = 3$ flips

Then $E(x) = np = \left(\frac{2}{3}\right)(3) = 2$

$VAR(X) = npq = (3)\left(\frac{2}{3}\right)\left(\frac{1}{3}\right) = \frac{6}{9} = \frac{2}{3}$

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#1, 2, 6