BERNOULLI

$X \sim \text{Bernoulli}(p) \quad p \in (0,1)$

$\Rightarrow \quad f_X(1) = p$

$f_X(0) = 1-p$

Is that a pdf?

(1) is it positive? $p > 0$ ✓ $(1-p) > 0$ ✓ ✓

(2) does it sum to one?

$\sum_{x \in S} f(x) = f(0) + f(1) = p + (1-p) = 1$ ✓

BINOMIAL DISTRIBUTION

$$P(X=x) = p^x (1-p)^{n-x} \binom{n}{x}$$

$p \in (0,1)$

$n = 1, 2, \ldots$

$x = 0, 1, 2, \ldots, n$

- p^x: probability of x matches
- $(1-p)^{n-x}$: $n-x$ no-matches
- $\binom{n}{x}$: number of possible orderings

Is it a pdf?

FILL IN THE BLANKS

KOBE BRYANT

Assume $p = \frac{483}{564} = 0.86$ $\times$ trials are indep

Then G = field goals $\sim \text{Binomial}(n=10, p=0.86)$

$E(G) = 8.6 \approx 9$ by intuitive definition

$$P(G=0) = \binom{10}{0} (0.86)^0 (0.14)^{10} = 2.9 \times 10^{-9}$$

$$P(G=10) = \binom{10}{10} (0.86)^{10} (0.14)^0 = 0.22 = 22\%$$

of STDs

$E(S) = 0.95 \times 0 + 0.04 \times 1 + 0.01 \times 2$

$= 0.06$

EXPECTATION

$$E\left(\sum_{i=1}^{n} X_i\right) = \sum E(X_i)$$

$$E(c f(X)) = c\, E(f(X))$$

$$E(c) = c.$$