Recap

PMF:

1) $f(x_i) \geq 0$
2) $\sum f(x_i) = 1$
3) $f(x_i) = P(X = x_i)$

CDF:

$F(x_i) = P(X \leq x_i)$

$0 \leq F(x) \leq 1$

if $x \leq y \rightarrow F(x) \leq F(y)$

Expected Value:

$$E(x) = E[X] = EX = \mu_x = \sum_{i=1}^{n} x_i \cdot f(x_i)$$

Variance:

$$\sigma^2 = V(x) = Var(x)$$
$$= \sum x_i^2 \cdot f(x_i) - (E(x))^2$$
$$= E[X^2] - (E[X])^2$$

Standard Deviation:

$$\sqrt{\sigma^2} = \sigma = \sqrt{E[X^2] - (E[X])^2}$$

① 5.6
② 1.6
③ 10.4
④ 2.6
⑤ 0.6

$\frac{\text{sum}}{n} = 4.16$

$$\frac{185 + 181 + 169 + 182 + 180}{5} = 179.4$$

Variance is not linear:

$$Var(aX+b) = a^2 \cdot Var(X)$$

Expectation is linear:

$$E(aX+b) = a \cdot E(X) + b$$

CDF vs. SF

$$P(X \leq 4) = P(X=0) + P(X=1) + \dots P(X=4)$$

$$P(X \geq 4) = 1 - P(X \leq 3)$$

$$sf + CDF = 1$$

$$cdf(4) + sf(4) = 1$$

$$P(X \leq 4) + (1 - P(X \leq 4))$$

CDF includes x

SF does not include x.