

HW2-STAT312**1****A** $P(A)$  **Ans**

$$P(A) = \frac{70+16}{100} = 0.86$$

B $P(B)$  **Ans**

$$P(B) = \frac{70+9}{100} = 0.79$$

C **Ans**

$$P(A') = 1 - P(A) = 1 - 0.86 = 0.14$$

D **Ans**

$$P(A \cap B) = \frac{70}{100} = 0.7$$

E **Ans**

$$P(A \cup B) = P(A) + P(B) - P(A \cap B) = 0.86 + 0.79 - 0.7 = 0.95$$

F **Ans**

$$P(A' \cup B) = P(A') + P(B) - P(A' \cap B) = 0.14 + 0.79 - 0.09 = 0.84$$

2**A** **Ans**

To start each character has 36 different options.

Since there are 5 vowels,

$$P(A) = \frac{5}{36}$$

B **Ans**

Since there are 5 even numbers,

$$P(B) = \frac{5}{36}$$

C **Ans**

Since all passwords are equally likely we can use the following:

$$P(A \cap B) = P(A) * P(B) = \frac{25}{1296}$$

D **Ans**

$$P(A \cup B) = P(A) + P(B) - P(A \cap B) = \frac{10}{36} - \frac{25}{1296} = \frac{335}{1296}$$

3**A** **Ans**

$$P(A) = \frac{1}{4}$$

$$P(B) = \frac{2}{3}$$

$$P(A \cap B) = P(A) * P(B) = \frac{1}{6}$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B) = \frac{1}{4} + \frac{2}{3} - \frac{1}{6} = \frac{3}{4}$$

B **Ans**

$$P(A) = \frac{1}{4}$$

$$P(B') = \frac{1}{3}$$

$$P(A \cap B') = P(A) * P(B') = \frac{1}{12}$$

$$P(A \cup B') = P(A) + P(B') - P(A \cap B') = \frac{1}{4} + \frac{1}{3} - \frac{1}{12} = \frac{1}{2}$$

C **Ans**

$$P(A') = \frac{3}{4}$$

$$P(B') = \frac{1}{3}$$

$$P(A' \cap B') = P(A') * P(B') = \frac{1}{4}$$

$$P(A' \cup B') = P(A') + P(B') - P(A' \cap B') = \frac{3}{4} + \frac{1}{3} - \frac{1}{4} = \frac{5}{6}$$

4

A

 Ans

$$P(1) = \frac{8}{7} * \frac{1}{2} = \frac{4}{7}$$

$$P(2) = \frac{8}{7} * \frac{1}{4} = \frac{2}{7}$$

$$P(3) = \frac{8}{7} * \frac{1}{8} = \frac{1}{7}$$

$$P(1) + P(2) + P(3) = \frac{4}{7} + \frac{2}{7} + \frac{1}{7} = 1$$

$\therefore f(x)$ is a probability mass function.

B

1

 Ans

$$P(X \leq 1) = P(1) = \frac{4}{7}$$

2

 Ans

$$P(X > 1) = 1 - P(1) = \frac{3}{7}$$

3

 Ans

$$P(2 < X < 6) = P(3) = \frac{1}{7}$$

4

 **Ans**

$$P(X \leq 1 \vee X = 2) = P(1 \cup 2) = P(1) + P(2) = \frac{4}{7} + \frac{2}{7} = \frac{6}{7}$$