HOMEWORK 3

10

a. Possible values of T are: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

b. Possible values of X are: –4, –3, –2, –1, 0, 1, 2, 3, 4, 5, 6.

c. Possible values of U are: 0, 1, 2, 3, 4, 5, 6.

d. Possible values of Z are: 0, 1, 2.

14.

a. As the hint indicates, the sum of the probabilities must equal 1. Applied here, we get $\sum_{y=1}^{5} p(y) = k[1 + 2 + 3 + 4 + 5] = 15k = 1 \Rightarrow k = \frac{1}{15}$. In other words, the probabilities of the five y-values are $\frac{1}{15}, \frac{2}{15}, \frac{3}{15}, \frac{4}{15}, \frac{5}{15}$.

b. $P(Y \le 3) = P(Y = 1, 2, 3) = \frac{1}{15} + \frac{2}{15} + \frac{3}{15} = \frac{6}{15} = .4$.

c. $P(2 \le Y \le 4) = P(Y = 2, 3, 4) = \frac{2}{15} + \frac{3}{15} + \frac{4}{15} = \frac{9}{15} = .6$.

d. Do the probabilities total 1? Let's check: $\sum_{y=1}^{5}\left(\frac{y^2}{50}\right) = \frac{1}{50}[1+4+9+16+25] = \frac{55}{50} \ne 1$. No, that formula cannot be a pmf.

19 $p(0) = P(Y = 0) = P(\text{both arrive on Wed}) = (.3)(.3) = .09$;
$p(1) = P(Y = 1) = P((\text{W,Th}) \text{ or } (\text{Th,W}) \text{ or } (\text{Th,Th})) = (.3)(.4) + (.4)(.3) + (.4)(.4) = .40$;
$p(2) = P(Y = 2) = P((\text{W,F}) \text{ or } (\text{Th,F}) \text{ or } (\text{F,W}) \text{ or } (\text{F,Th}) \text{ or } (\text{F,F})) = .32$;
$p(3) = 1 - [.09 + .40 + .32] = .19$.

24

a. Possible X values are those values at which $F(x)$ jumps, and the probability of any particular value is the size of the jump at that value. Thus we have:

x	1	3	4	6	12
$p(x)$	.30	.10	.05	.15	.40

b. $P(3 \le X \le 6) = F(6) - F(3-) = .60 - .30 = .30$; $P(4 \le X) = 1 - P(X < 4) = 1 - F(4-) = 1 - .40 = .60$

30

a. $E(Y) = \sum_{y=0}^{3} y \cdot p(y) = 0(.60) + 1(.25) + 2(.10) + 3(.05) = .60$.

b. $E(100Y^2) = \sum_{y=0}^{3} 100y^2 \cdot p(y) = 0(.60) + 100(.25) + 400(.10) + 900(.05) = \$110$.

39 From the table, $E(X) = \sum xp(x) = 2.3$
$E(X^2) = 6.1$, and $V(X) = 6.1 - (2.3)^2 = .81$

Each lot weighs 5 lbs, so the number of pounds left = $100 - 5X$:
Thus the expected weight left is $E(100 - 5X) = 100 - 5E(X) = 88.5$ lbs.
The variance of the weight left is $V(100 - 5X) = V(-5X) = (-5)^2V(X) = 25V(X) = 20.25$.