## HW 5.2(a) Key

1. Let X and Y be discrete random variables with joint probability mass function given by

$$f(x,y) = \frac{1}{293}(6-x)(9+y)$$
 for  $x = 1,2,3$  and  $x \le y \le 3$ . Find  $P[X < Y]$ .

- B) 0.5062
- C) 0.5229
- D) 0.5396
- E) 0.5730

$$P[X = f(1,2) + f(1,3) + f(2,3)$$

$$= \frac{1}{293} \left[ 5(11) + 5(12) + 4(12) \right]$$

$$= 0.5563$$

2. Let X and Y be discrete random variables with joint probability mass function given by

$$f(x,y) = \frac{1}{165}(10-x)(1+y)$$
 for  $x = 1,2,3$  and  $x \le y \le 3$ . Find  $Var[X+Y]$ .

- A) 1.450
- B) 1.493 C) 1.537 D) 1.580

3. Let X and Y be discrete random variables with joint probability mass function given by

$$f(x,y) = (0.68^x)(0.32^y)$$
 for  $x = 1, 2, 3, ...$  and  $y = 1, 2, 3, ...$  Find  $P[X + Y \ge 4]$ .

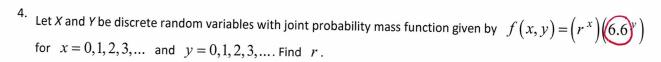
- A) 0.5648
- B) 0.4970 C) 0.5309
- D) 0.5987
- E) 0.6326

$$P[X+Y \ge 4] = 1 - P[X+Y \le 3]$$

$$= 1 - f(1,1) - f(1,2) - f(2,1)$$

$$= 1 - 0.68(0.32) - 0.68(0.32)^{2} - (0.68)^{2}(0.32)$$

$$= 0.5648$$



A) 1.1786

B) 1.0371

C) 1.1079

D) 1.2493

E) 1.3200

This problem is
flawed. This is not
a valid pmf.
The "correct"
answer is

1 X-1/1-16/-X

# / = / 1- / (-9.6) # /= - /5.6+5/6r = / 5.6r = / 6.4 # / = / 1.1/186

b is the base in the 2nd exponential.

(i.e. b=6.6 here)

5. Let *X* and *Y* be discrete random variables with joint probability mass function given by f(x,y) = k(4.2 + xy) for x = 2,3,4 and  $1 \le y \le x$ , where y is an integer. Find P[X-Y=1].

A) 0.5415

B) 0.5090

C) 0.5253

D) 0.5578

E) 0.5740

$$f(z,1) + f(3,1) + f(3,2) + f(4,1) + f(4,2) + f(4,3) = 1$$

$$k \left[ (4,2+2) + (4,2+3) + (4,2+6) + (4,2+4) + (4,2+8) + (4,2+12) \right] = 1$$

$$k \left[ 6(4,2) + (2+3+6+4+8+12) \right] = 1$$

$$k = \frac{1}{60.2}$$

$$P[X-Y=1] = f(2,1) + f(3,2) + f(4,3)$$

$$= \frac{1}{60.2} [(4.2+2) + (4.2+6) + (4.2+12)]$$

$$= 0.5415$$