

Homework Assignment 3

Rabinowitz

Chapter 4

3.

$$P(X=0) = 1/6$$

$$P(X=1) = 2/3$$

$$P(X=2) = 1/6$$

11. $(2)(2/3) + (3)(1/3) = 7/3$

13. (i) $2(.49) + 2(.21) = 1.4$

(ii) $2(.49) + 1(.7)(.3) = 1.19$

15. $E(X) = 1/3 + 4/3 = 5/3$

$$E(Y) = 2(2/3)^2 + (1/3)(2/3) + (2/3)(1/3) + (1/3)^2 = 13/9$$

16. (i) $1/6 + 2/6 + 3/6 + 4/6 = 5/3$

(ii) $1/6 + 2/6 + 2/6 + 2/6 = 7/6$

Chapter 5

2.
$$\frac{(54!/5!49!)(44!/2!42!)}{(98!/91!7!)}$$

5.
$$\frac{(5)(45!/39!6!)}{(50!/40!10!)}$$

11.
$$\frac{(7!/4!3!)}{(10!/6!4!)}$$

$$12. \quad (i) \quad \frac{(3)(6!/4!2!)}{(10!/6!4!)}$$

$$(ii) \quad \frac{(4)(5!/3!2!)}{(10!/6!4!)}$$

$$15. \quad (i) \quad \text{Urn 1: } \frac{(4!/2!2!)(3!/2!1!)}{(7!/4!3!)} \quad \text{Urn 2: } \frac{(4!/2!2!)(5!/3!2!)}{(9!/5!4!)}$$

$$(ii) \quad \frac{(4!/2!2!)(3!/2!1!)}{(2)(7!/4!3!)} + \frac{(4!/2!2!)(5!/3!2!)}{(2)(9!/5!4!)}$$

$$20. \quad (7,059,051/7,059,052)^{2600} = .9996317$$

$$1 - .9996317 = .000368$$

$$21. \quad \frac{(10!/6!4!)(8!/7!1!) + (10!/5!5!)}{(18!/13!5!)}$$

Tjims

$$3.10 \quad 1 - (38!/28!10!)/38^{10}$$

$$3.16 \quad P(\text{Winning in position } x) = (x-1)(1/365)(364/365)^{(x-2)}$$

$$3.18 \quad 1 - (5,474/5,475)^{30} = .005465$$

$$4.2 \quad P(\text{At least 1 in 6 rolls}) = 1 - (5/6)^6 = .6651$$

$$P(\text{At least 2 in 12 rolls}) = 1 - (5/6)^{12} - 12(1/6)(5/6)^{11} = .6187$$

$$P(\text{At least 3 in 18 rolls}) = 1 - (5/6)^{18} - 18(1/6)(5/6)^{17} \\ - (18!/16!2!)[(5/6)^{16}][(1/6)^2] = .5973$$

$$4.4 \quad P(X \text{ is odd}) = .5$$

$$P(X \text{ is 0 or 8}) = 2/256 = .0078125$$

$$P(X=2,4,6) = .4921875$$

$$.5 + (2)(.0078125) - .4921875 = .02344$$

Bean thrower has an advantage

$$9.2 \quad E(X) = \sum 2^n (1/n) (x/n)$$

$$9.28 \quad 1 - (2)(.0433) = .9133$$

$$9.30 \quad \frac{(10!/8!2!) + (5)(10!/7!3!) + (5!/3!2!)(10!/6!4!) + (5!/3!2!)(10!/5!5!)}{(15!/8!7!)}$$

$$(15!/8!7!)$$