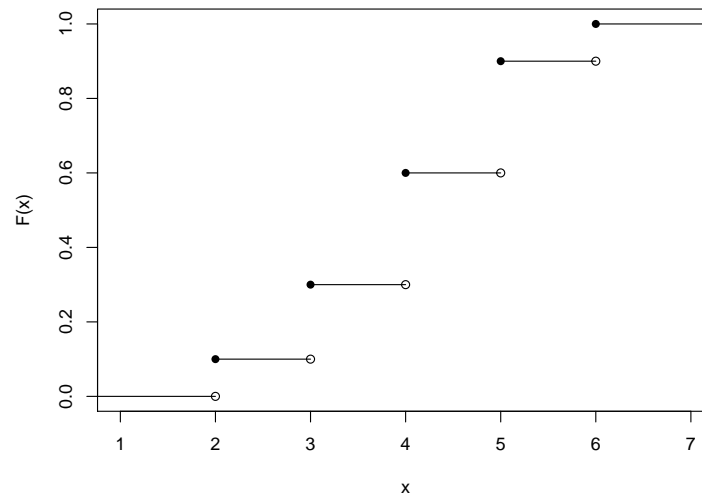
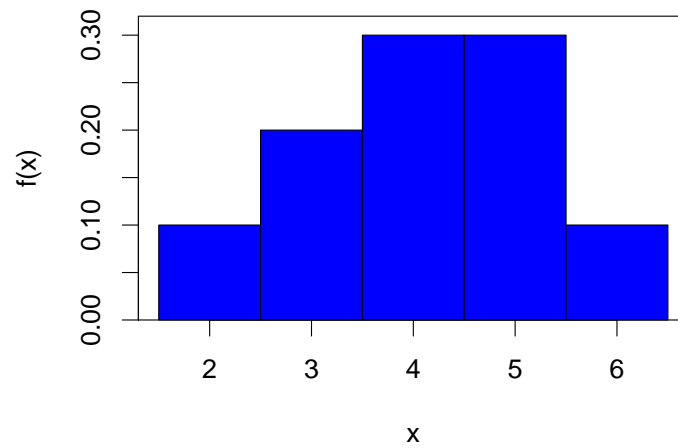


# Homework 5

Due February 20, 2020 at 11:59 PM

1. P. 243: 1

(a) (3 points)



(b) (2 points)

$$E(X) = 2(0.1) + 3(0.2) + 4(0.3) + 5(0.4) + 6(0.1) = 4.1$$

$$E(X^2) = 2^2(0.1) + 3^2(0.2) + 4^2(0.3) + 5^2(0.3) + 6^2(0.1) = 18.1, \text{ so}$$

$$Var(X) = E(X^2) - (E(X))^2 = 18.1 - 4.1^2 = 1.29.$$

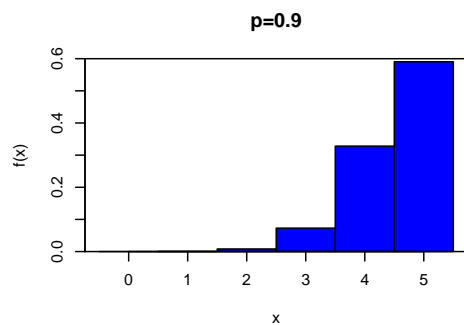
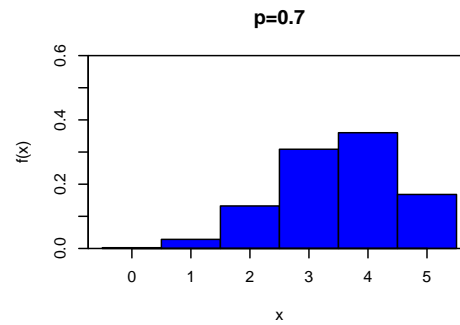
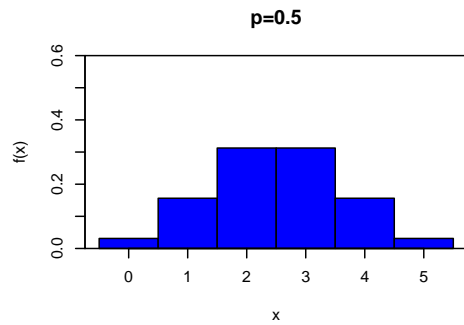
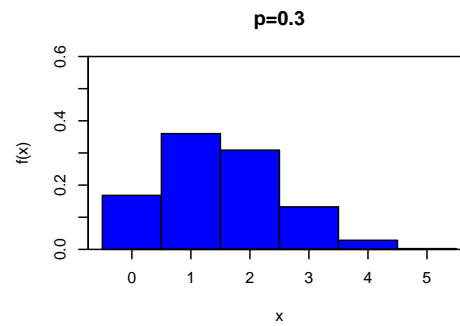
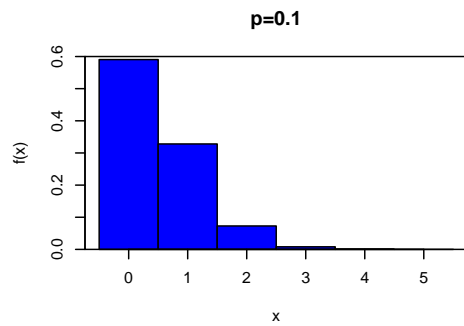
The standard deviation of  $X$  is  $\sqrt{1.29} = 1.136$ .

2. P. 244: 4

(3 points for each  $p$ )

Use equation (5-3) with  $n = 5$ .

$p$	$f(0)$	$f(1)$	$f(2)$	$f(3)$	$f(4)$	$f(5)$	$E(X) = np$	$Var(X) = np(1 - p)$	Std.Dev.
0.1	0.5905	0.3280	0.0729	0.0081	0.0005	0.0000	0.5	0.45	0.671
0.3	0.1681	0.3601	0.3087	0.1323	0.0284	0.0024	1.5	1.05	1.025
0.5	0.0312	0.1562	0.3125	0.3125	0.1562	0.0312	2.5	1.25	1.118
0.7	0.0024	0.0284	0.1323	0.3087	0.3601	0.1681	3.5	1.05	1.025
0.9	0.0000	0.0004	0.0081	0.0729	0.3280	0.5905	4.5	0.45	0.671



3. P. 322: 1

Use equation (5-3) with  $n = 6$  and  $p = 0.9$ .

(a) (3 points)

$$P(X = 6) = 0.531$$

(b) (3 points)

$$P(X \geq 4) = 0.984$$

(c) (3 points)

$$P(X < 4) = 1 - P(X \geq 4) = 0.016$$

(d) (3 points)

$$E(X) = np = 5.4$$

(e) (3 points)

$$Var(X) = np(1 - p) = 0.54, SD(X) = \sqrt{0.54} = 0.735$$

4. P. 322: 2

Use equation (5-3) with  $n = 10$  and  $p = 0.15$ .

(a) (3 points)

$$P(X = 2) = 0.276$$

(b) (3 points)

$$P(X \geq 1) = 1 - P(X < 1) = 1 - P(X = 0) = 1 - 0.197 = 0.803$$

(c) (3 points)

$$E(X) = np = 1.5$$

(d) (3 points)

$$Var(X) = np(1 - p) = 1.275$$

(e) (3 points)

$$SD(X) = \sqrt{1.275} = 1.129$$

Use equation (5-3) with  $n = 6$  and  $p = 0.9$ .