4. Let x = the number of nonzero digits in a randomly selected 4-digit PIN that has no restriction on the digits.

What are the possible values of x? Give three possible outcomes and their associated x values?

Hence, x can be $\{0, 1, 2, 3, 4\}$.

0300, x = 1, only 3 is nonzero

1200, x = 2, only 1 and 2 are nonzero

2301, x = 3, 2, 3, 1 are nonzero.

6.

* There are five possible outcomes and their values.

Sample Space S:	L	AL	RRAL	RL	RAL
Number of cars X:	1	2	4	2	3

8.

Y

3 → {SSS} ← 3 trials, 3 consecutive successes, in 3 trials

4 → {FSSS} ← 4 trials, 3 consecutive successes, in 4 trials

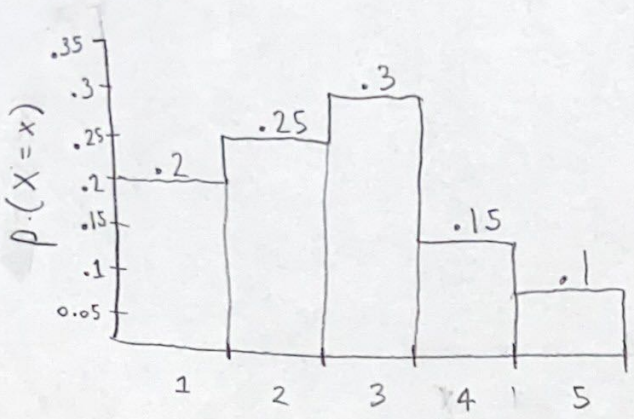
5 → {FFSSS, SFSSS} ← 5 trials, 3 consecutive successess in 5 trials

6 → {FFFSSS, SSFSSS, SFFSSS, FSFSSS} ← 6 trials, 3 consecutive successes in 6 trials

7 → {FFFFSSS, FFSFSSS, FSFFSSS, SFFFSSS, FSSFSSS, SSFFSSS, SFSFSSS} ← 7 trials, 3 consecutive successes in 7 trials

11.

a.



b. $P(X \geq 2) = P(x=2) + P(X=3) + P(x=4)$

$= .3 + .15 + .1 = .55$

The probability that at least two students show up is 55%.

$p(x>2) \rightarrow p(x>2) = p(x=3) + p(x=4)$

$= .15 + .10 = .25$

The probability that more than two students show up is 25%

c. $P(1 \leq X \leq 3) = P(x=1) + P(x=2) + P(x=3)$

$.25 + .3 + .15 = .7 \rightarrow$

The probability that between one and three show up 70%.

D. We cannot find this value

14.

A. $\sum p(y) = 1$

$\rightarrow 15k = 1$

$\rightarrow k = \frac{1}{15}$ $\rightarrow$ value of k is $\frac{1}{15}$

b. $1 - (p(y=4) + p(y=5))$

$= 1 - p(y=4) - p(y=5)$

$= 1 - 4k - 5k$

$= 1 - 9k$

$P(y<3) = 1 - \frac{9}{15} = \frac{6}{15} = .4$

The probability is 0.4 or 40%

C. $\sum yp(y)$

$1 = 1 \times k + 2 \times 2k + 3 \times 3k + 4 \times 4k + 5 \times 5k$

$= k + 4k + 9k + 16k + 25k$

$= (1 + 4 + 9 + 16 + 25)k$

$= 55k$

$= 55 \times \frac{1}{15} \left(k = \frac{1}{15}\right) = 3.667$

The expected number of forms required is 3.667

D.

$E(y^2) - \mu_y^2$

$= 15 - 3.667^2$

$= 15 - 13.45$

$= 1.55$

$= \sqrt{1.55} = 1.24$

The standard deviation of the number of forms required is 1.24

23.

a. $p(2) = p(x=2)$

$F(2) - F(1)$

$= .39 - .19$

$= .2$ → value of $p(2) = .2$

b. $P(x>3) = 1 - p(x \leq 3)$

$= 1 - F(3)$

$= 1 - 0.67$

$= .33$ → The value of $p(x>3)$ is .33

c. $P(2 \leq x \leq 5) = p(x \leq 5) - p(x < 2)$

$= p(x \leq 5) - p(x \leq 1)$

$= F(5) - F(1)$

$= .97 - 0.19$

$= .78$ → The value of $p(2 \leq x \leq 5)$ is .78

D. $P(2 < x < 5) = p(x=3) + p(x=4)$

$= p(3) + p(4)$

$= [F(3) - F(2)] + [F(4) - F(3)]$

$= F(4) - F(2)$

$.92 - .39$

$= .53$

The value of $p(2 < x < 5)$ is .53