

1. Binomial random variable.

Note:  $X$ , number of Spades, is binomial with  $n = 25$  and  $p = .25$ .

(a)  $\mu = np = (25)(.25) = 6.25$

(b)  $P(X < 5) = P(X \leq 4) = .2137$

(c)  $P(X = 10) = P(X \leq 10) - P(X \leq 9) = .9703 - .9287 = .0416$

2. Normal random variable.

Note:  $X$ , length of lizard, is normal with  $\mu = 17.5$  and  $\sigma = 2.8$ .

(a)  $P(X < 14.0) = P\left(\frac{X - \mu}{\sigma} < \frac{14.0 - 17.5}{2.8}\right) = P(Z < -1.25) = .1056$

(b)  $z = 2.33 \therefore P(Z \leq 2.33) \approx .99$

$$z = \frac{x - \mu}{\sigma}; 2.33 = \frac{x - 17.5}{2.8}; x = 17.5 + (2.33)(2.8) = 24.02$$

3. Correlation and regression by calculator.

(a)  $r = .976$

(b)  $b = r\left(\frac{s_y}{s_x}\right) = .976\left(\frac{5.87}{6.15}\right) = 0.932$

$$a = \bar{y} - b\bar{x} = 15.92 - (0.932)(16.75) = 0.309$$

$$\hat{y} = 0.309 + 0.932x$$

4. Probability.

$A$ : {Selected investor invests money into stocks}

$B$ : {Selected investor invests money into mutual funds}

Note:  $P(A) = .41$ ;  $P(B) = .87$ ;  $P(A \cap B) = .38$

(a)  $P(A \cup B) = P(A) + P(B) - P(A \cap B) = .41 + .87 - .38 = .900$

(b)  $P(A|B) = \frac{P(A \cap B)}{P(B)} = \frac{.38}{.87} = .437$

(c)  $P(A \cap B) = .38$  but  $P(A)P(B) = (.41)(.87) = .357$

$\Rightarrow$  Two events are not independent.

5. Contingency table.

(a) Conditional percentages are as follows.

Gender	Political affiliation		
	Democrat	Independent	Republican
Female	86.0%	5.7%	8.3%
Male	86.0%	1.5%	12.4%

(b) Proportionately, more women than men are Independents, and more men than women are Republicans.

6. Probability.

$$P(\text{at least one defective}) = 1 - P(\text{all nondefective}) = 1 - (.995)^3 = .015$$

7. Correlation and regression by SPSS.

(a)  $\hat{y} = -31.625 + 51.7(2) = 71.78$

(b)  $r^2 = .943 \Rightarrow$  Approximately 94% of the variability in the data is accounted for by the regression model.