

1. Probability.

E : {selected employee is male}

F : {selected employee holds managerial duty}

Note: $P(E) = .68$; $P(F) = .37$; $P(E \cap F) = .29$

$$(a) P(E|F) = \frac{P(E \cap F)}{P(F)} = \frac{.29}{.37} = .784$$

$$(b) P(E \cup F) = P(E) + P(F) - P(E \cap F) = .68 + .37 - .29 = .760$$

$$(c) P(E \cap F) = .29 \text{ but } P(E)P(F) = (.68)(.37) = .252 \\ \Rightarrow \text{Two events are not independent.}$$

2. Binomial random variable.

Note: X , number of obese children, is binomial with $n = 15$ and $\pi = .30$.

$$(a) P(X \leq 5) = .7216$$

$$(b) P(X = 7) = P(X \leq 7) - P(X \leq 6) = .9500 - .8689 = .0811$$

$$(c) P(X > 4) = 1 - P(X \leq 4) = 1 - .5155 = .4845$$

3. Probability.

Use complement.

$$P(\text{at least one girl}) = 1 - P(\text{all boys}) = 1 - (.5)^4 = .9375$$

4. Correlation and regression by calculator.

$$(a) \hat{y} = 4.046 + 0.374x$$

$$(b) r = .799$$

5. Normal random variable.

Note: X , height of male, is normal with $\mu = 70.0$ and $\sigma = 3.5$.

$$(a) P(X \geq 68.0) = P\left(\frac{X - \mu}{\sigma} \geq \frac{68.0 - 70.0}{3.5}\right) = P(Z \geq -0.57) \\ = 1 - P(Z < -0.57) = 1 - .2843 = .7157 \Rightarrow 71.57\%$$

$$(b) z = -0.67 \because P(Z \leq -0.67) \approx .25$$

$$z = \frac{x - \mu}{\sigma}; -0.67 = \frac{x - 70.0}{3.5}; x = 70.0 + (-0.67)(3.5) = 67.66$$

6. Correlation and regression by SPSS.

(a) The relationship is negative because the slope coefficient is negative ($b = -0.034$).

(b) $s_e = 0.20443$. The average amount of prediction error is estimated to be 0.204 tons per hectare.