

$$12/ \quad P(\text{correct}) = \frac{1}{5}$$

Let $X = \# \text{ correct}$

$$P(X=7) = {}^{10}C_7 \left(\frac{4}{5}\right)^3 \left(\frac{1}{5}\right)^7$$

$$14b) \quad P(J) = 0.012$$

$$\begin{aligned} P(>\$200000) &= P(\text{more than 20 draws}) \\ &= P(J=0/20) \\ &= (0.988)^{20} \end{aligned}$$

$$16/ \quad P(\geq 3 \text{ boys}) = \frac{1}{2^3} = \frac{1}{8}$$

$X =$ family has 3 boys

$$\begin{aligned} P(X \geq 1) &= 1 - P(X=0) \\ &= 1 - {}^5C_0 \left(\frac{7}{8}\right)^5 \left(\frac{1}{8}\right)^0 \\ &= 1 - \left(\frac{7}{8}\right)^5 \end{aligned}$$

$$P(\text{more B than G}) = \frac{1}{2}$$

$Y = \text{more B than G}$

$$\begin{aligned} P(Y=5) &= {}^5C_5 \left(\frac{1}{2}\right)^0 \left(\frac{1}{2}\right)^5 \\ &= \left(\frac{1}{2}\right)^5 \end{aligned}$$

$$18/ \quad P(\text{rain}) = \frac{18}{30} = \frac{3}{5}$$

$$0.0124$$

$$\begin{aligned} \text{a) } P(\text{FFWWW}) &= \frac{2}{5} \times \frac{2}{5} \times \frac{3}{5} \times \frac{3}{5} \times \frac{3}{5} \\ &= \frac{108}{3125} = 0.0346 \end{aligned}$$

b) Let $X = \# \text{ rainy days.}$

$$P(X \geq 3) = {}^5C_3 \left(\frac{2}{5}\right)^2 \left(\frac{3}{5}\right)^3 + {}^5C_4 \left(\frac{2}{5}\right) \left(\frac{3}{5}\right)^4 + \left(\frac{3}{5}\right)^5$$

206)

1955	1962
6,	4

$$P(\text{start}) = 0.65 \quad 0.80$$

$$\begin{aligned}
 P(4 \text{ cors start}) &= P({}^4C_2 0_{55}) + P({}^6C_2 1_{55}) + \dots \\
 &= {}^4C_4 (0.2)^0 (0.8)^2 \times {}^6C_0 (0.3)^6 (0.65)^0 \\
 &\quad + {}^4C_3 (0.2)^1 (0.8)^3 \times {}^6C_1 (0.3)^5 (0.65)^1 \\
 &\quad \vdots
 \end{aligned}$$

① $P(X=4, Y=0)$

② $P(X=3, Y=1)$

③ $P(X=2, Y=2)$

④ $P(X=1, Y=3)$

⑤ $P(X=0, Y=4)$