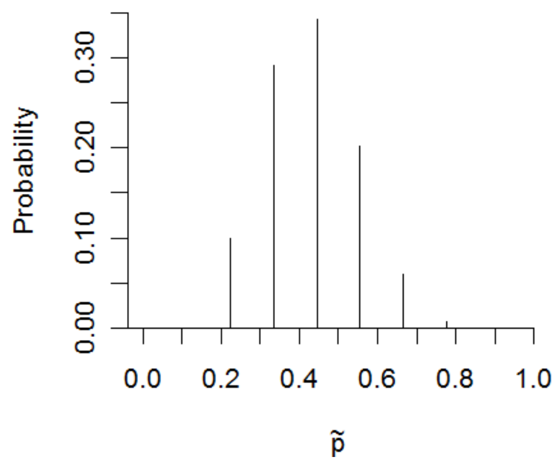
MATH1001 Homework Solution

Chapter 9

9.1.3

(a) (i) 0.10; (ii) 0.29; (iii) 0.34; (iv) 0.20; (v) 0.06; (vi) 0.01

(b)



9.2.4

$\tilde{p}$ = (28 + 2)/(580 + 4) = 0.051; SE = $\sqrt{\dfrac{0.51(1-0.51)}{584}}$ = 0.009.

The 95% confidence interval is 0.051 ± (1.96)(0.009) or (0.033,0.069) or 0.033 < p < 0.069.

9.2.9

Desired SE = 0.01; guessed $\tilde{p}$ = 0.7. The required n must satisfy the inequality

$$\sqrt{\frac{0.7(0.3)}{n+4}} \le 0.01.$$

It follows that $\dfrac{\sqrt{0.7(0.3)}}{0.01} \le \sqrt{n+4}$

or $\dfrac{0.7(0.3)}{0.01^2} \le$ n+4 or 2100 ≤ n+4, so n ≥ 2096.

9.4.3

The hypotheses are

H_0: The bee could not distinguish the patterns (Pr{Flower 1} = 0.5)
H_A: The bee could distinguish the patterns (Pr{Flower 1} > 0.5)

Flower 1	Flower 2
20 (12.5)	5 (12.5)

$\chi^2_s = 9.00$. With df = 1, Table 9 gives $\chi^2_{0.01} = 6.63$ and $\chi^2_{0.001} = 10.83$, so $0.0005 < P < 0.005$ and we reject H_0. There is sufficient evidence ($0.0005 < P < 0.005$) to conclude that the bee could distinguish the patterns.

9.4.4

(a) $\chi^2_s = 13.3$

(b) H_0: Timing of births is random (Pr{weekend = 2/7});

H_A: Timing of births is not random (Pr{weekend ≠ 2/7})

(c) We reject H_0 because the P-value is smaller than 0.05. We have sufficient evidence (P=0.0003) to conclude that the timing of births is not random; rather, there are fewer weekend births than would be expected by chance.