

# Math 741 Assignment 9 (Hand-In)

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6.3.4.(H)

solution: Given,

$$H_0 : p = 0.45$$

$$H_1 : p > 0.45$$

where  $n = 200, \alpha = 0.14$ . WTF  $x$  value such that  $H_0$  will be rejected.

Since this is a right-tail test,

$$z = \frac{x - np_0}{\sqrt{np_0(1 - p_0)}} = \frac{x - 200 \cdot 0.45}{\sqrt{200 \cdot 0.45 \cdot 0.55}}$$

And  $z_\alpha = z_{0.14} = 1.0803$ . In order to reject  $H_0$ ,  $z > z_\alpha$  must hold. Therefore,

$$\frac{x - 200 \cdot 0.45}{\sqrt{200 \cdot 0.45 \cdot 0.55}} > 1.0803 \implies x > 97.6006$$

Hence, the smallest number of successes that will cause  $H_0$  to be rejected is 98.

6.3.6.(H)

solution: Let  $p$  denote the proportion of death in the month preceding their birth month, if people do not postpone their deaths, it should be  $\frac{1}{12}$ . Therefore,

$$H_0 : p = 1/12$$

$$H_1 : p < 1/12$$

where  $n = 348, x = 16, \alpha = 0.05$ . Then

$$z = \frac{x - np_0}{\sqrt{np_0(1 - p_0)}} = \frac{16 - 348 \cdot \frac{1}{12}}{\sqrt{348 \cdot \frac{1}{12} \cdot \frac{11}{12}}} = -2.52138$$

And  $-z_\alpha = -z_{0.05} = -1.64485$ . Since  $-2.52138 < -1.64485$ , reject  $H_0$ . In conclusion, there is enough evidence to conclude that celebrities postpone their deaths with significance level 0.05.