

**EX 11.2:** According to the company that makes M&M candies, they make 30% brown, 20% yellow, 20% red, 10% orange, 10% green and 10% blue M&M's. To test this claim, some student bought several packages of M&M's and found the following:

Brown	Yellow	Red	Orange	Green	Blue
84	79	75	49	36	47

Do the data support the company's claim? Test at the  $\alpha = 0.1$  significance level.

$$H_0: p_1 = 0.3, p_2 = 0.2, \dots, p_6 = 0.1$$

$$H_1: H_0 \text{ not true}$$

$$n = 84 + 79 + 75 + 49 = 370 \quad E_1 = 370(0.3) = 111, \quad E_2 = 370(0.2) = 74, \dots, \quad E_6 = 370(0.1) = 37$$

$$\chi^2 = \frac{(84-111)^2}{111} + \frac{(79-74)^2}{74} + \dots + \frac{(47-37)^2}{37} = \boxed{13.54}$$

Reject  $H_0$  if  $\chi^2 > \chi^2_{\alpha, k-1} = 9.236$  using  $(k-1) = 5$  d.f.  $\otimes$

13.547 > 9.236  $\Rightarrow$  reject  $H_0 \Rightarrow$  data does not support company's claim.