

name: Solution

1 (10 points). Use the chi-squared distribution table to test the claim that gender does affect the use of Instagram given the data

$H_0$ : gender doesn't affect

$H_a$ : gender does affect

	use instagram	don't use instagram
male	298	234
female	209	328

w/ totals

	u	D.u.	Totals
M	298	234	532
F	209	328	537
Totals	507	562	1069

expected values

• males using instagram

$$532 \left( \frac{507}{1069} \right) = 252.31 \approx 252$$

↳ % all instagram users  
↳ total males

• females using instagram

$$537 \left( \frac{507}{1069} \right) \approx 255$$

• males don't use instagram

$$532 \left( \frac{562}{1069} \right) \approx 280$$

• females don't use instagram

$$537 \left( \frac{562}{1069} \right) \approx 282$$

test statistic

$$\chi^2 = \frac{(252-298)^2}{252} + \frac{(255-209)^2}{255} + \frac{(280-234)^2}{280} + \frac{(282-328)^2}{282} = 31.76$$

P-value @ df = 1

$$\chi^2 = 6.63 @ \alpha = 0.01$$

∵  $\chi^2 > \chi^2$  so the P-value of 31.76 is less than 0.01 so significant.

Conclude: reject  $H_0$   
∴ accept the claim that gender affects use of instagram