Name: **Statistics**

Date: **Practice Quiz 8-C**

1. Mars Inc. has two factories that make M&Ms. From their Tennessee factory, 20.7% of the M&Ms are blue, 20.5% are orange, 19.8% are green, 13.5% are yellow, 13.1% are red, and 12.4% are brown. In a random sample, 97 are blue, 97 are orange, 56 are green, 54 are yellow, 44 are red, and 52 are brown.

a) How many degrees of freedom are there?

df = _____ – 1 = _____

b) What is the critical value?

Look in the .05 column of the χ^2 table in the book or an online χ^2 table.

c) Sketch the χ^2 curve, label the peak of the curve and the critical value, and shade the critical region.

Sketch

All χ^2 curves start at χ^2 = _____, because squares cannot be negative.

The peak of a χ^2 curve is df – 2, which in this case is χ^2 = _____.

χ^2 curves are skewed _____.

d) Calculate χ^2 without using a calculator test.

Color	# Observed (O)	Proportion Expected	# Expected (E)	O – E	$(O-E)^2$	$(O-E)^2 \div E$
Blue	97	.207	82.8	14.2	201.64	2.44
Orange	97	.205	82.0	_____	_____	2.74
Green	56	.198	79.2	-23.2	538.24	_____
Yellow	54	_____	_____	_____	_____	_____
Red	44	_____	_____	_____	_____	1.35
Brown	52	_____	_____	_____	_____	_____
	$\Sigma O = 400$	1.000	$\Sigma E = 400$		$\chi^2 = \Sigma$ _____	= 13.44

e) What does the value of zero mean in the last column?

There was _____ between the expected number of _____ M&Ms in the sample and the actual number of _____ M&Ms in the sample, that is, it perfectly supports the _____ hypothesis.

f) Are the data statistically significant?

_____, because the calculated value of χ^2 is _____ than the critical value of χ^2.

g) State the conclusion, followed by $\chi^2(df)$ and a *p* value range.

M&Ms from Scotts Valley Market _____ follow the Tennessee factory distribution, χ^2(_____) = _____, p _____ .05.

h) Which color contributed the most to this conclusion, and which color contributed the least?

_____ contributed the most, and _____ contributed the least.

i) What would the conclusion have been if the answer to (d) had been 10.18?

_____ that M&Ms from Scotts Valley Market _____,

χ^2(_____) = _____, p _____ .05.