

Name:

Statistics

Date:

Practice Quiz 8-D

1. State the critical value(s) for the following  $\chi^2$  tests of a single variance with a sample size of 20.

a) right-tailed

For  $df =$  \_\_\_\_\_ in the \_\_\_\_\_ column,  $\chi^2_{\alpha} =$  \_\_\_\_\_.

b) left-tailed

For  $df =$  \_\_\_\_\_ in the \_\_\_\_\_ column,  $\chi^2_{\alpha} =$  \_\_\_\_\_.

c) two-tailed

For  $df =$  \_\_\_\_\_, in the \_\_\_\_\_ column,  $\chi^2_{\alpha/2} =$  \_\_\_\_\_, and in the \_\_\_\_\_ column,  $\chi^2_{\alpha/2} =$  \_\_\_\_\_.

2. Mendoza Farms has a new automatic loader that may be more or less consistent than the old one. Previously, the average wheat shipment was 800 kg, with standard deviation 15.5 kg. A random sample of shipments with the new loader has the following weights, in kg: 802, 811, 797, 788, 786, 810, 804, 790, 794, 804, and 799.

a) How many degrees of freedom are there?

$df =$  \_\_\_\_\_ - 1 = \_\_\_\_\_

b) What are the critical values for a two-tailed  $\chi^2$  test?

For  $df =$  \_\_\_\_\_, in the \_\_\_\_\_ column,  $\chi^2_{\alpha/2} =$  \_\_\_\_\_, and in the \_\_\_\_\_ column,  $\chi^2_{\alpha/2} =$  \_\_\_\_\_.

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

All  $\chi^2$  curves start at  $\chi^2 =$  \_\_\_\_\_, because squares cannot be negative.

The peak of a  $\chi^2$  curve is  $df - 2$ , which in this case is  $\chi^2 =$  \_\_\_\_\_.

$\chi^2$  curves are skewed \_\_\_\_\_.



d) Calculate  $\chi^2$  for the standard deviation, and mark it on the curve.

The population variance being tested is  $\sigma^2 =$  \_\_\_\_\_  $^2 =$  \_\_\_\_\_.

The calculated sample variance is  $s^2 =$  \_\_\_\_\_  $^2 =$  \_\_\_\_\_.

There are \_\_\_\_\_ degrees of freedom.

$\chi^2 =$  \_\_\_\_\_ ( \_\_\_\_\_ ) = \_\_\_\_\_

e) Are the data statistically significant?

\_\_\_\_\_, because the calculated value of  $\chi^2$  is \_\_\_\_\_ than \_\_\_\_\_.

f) State the conclusion, followed by  $\chi^2(df)$  and a range for  $p$ .

The standard deviation of shipment weights with the new loader is \_\_\_\_\_ than 15.5 kg,  $\chi^2($  \_\_\_\_\_ ) = \_\_\_\_\_,  $p$  \_\_\_\_\_ .05.

g) What would the conclusion have been if the answer to (d) had been  $\chi^2 = 24.04$ ?

The standard deviation of shipment weights with the new loader is \_\_\_\_\_ than 15.5 kg,  $\chi^2($  \_\_\_\_\_ ) = \_\_\_\_\_,  $p$  \_\_\_\_\_ .05.

h) What would the conclusion have been if the answer to (d) had been  $\chi^2 = 14.04$ ?

\_\_\_\_\_,  $\chi^2($  \_\_\_\_\_ ) = \_\_\_\_\_,  $p$  \_\_\_\_\_ .05.