Further hypothesis tests 6D

1 Critical value is $F_{10,6} = 4.06$

$$F_{\text{test}} = \frac{7.6}{6.4} = 1.1875$$

not in critical region

accept H_0 – there is evidence to suggest that $\sigma_1^2 = \sigma_2^2$

2 Critical value is $F_{24,40} = 2.29$

$$F_{\text{test}} = \frac{0.42}{0.17} = 2.4706$$

In critical region

reject H_0 – there is evidence to suggest that $\sigma_1^2 > \sigma_2^2$

3 a $H_0 : \sigma_1^2 = \sigma_2^2 \quad H_1 : \sigma_1^2 \neq \sigma_2^2$

Critical value is $F_{12,8} = 3.28$

$$F_{\text{test}} = \frac{225}{63} = 3.57$$

In critical region

reject H_0 – there is evidence to suggest that the machines differ in variability

b Population distributions are assumed to be normal.

4 Critical value is $F_{8,12} = 2.85$

$$F_{\text{test}} = \frac{52.6}{36.4} = 1.445$$

not in critical region

accept H_0 – there is evidence to suggest that $\sigma_1^2 = \sigma_2^2$

5 a $\sigma^2_{\text{goodstick}} = 1.363$

$\sigma^2_{\text{Holdtight}} = 0.24167$

Critical value is $F_{4,5} = 5.19$

$$F_{\text{test}} = \frac{1.363}{0.24167} = 5.64$$

In critical region

reject H_0 – there is evidence to suggest that the variance are not equal.

b Holdtight, as it is less variable and cheaper.

6 $\sigma^2_{\text{Chegrit}} = 22143.286$

$\sigma^2_{\text{Dicabalk}} = 6570.85238$

Critical value is $F_{6,14} = 2.85$

$$F_{\text{test}} = \frac{22143.286}{6570.85238} = 3.3699$$

In critical region, so reject H_0 – there is evidence to suggest that their variances differ.

7 **a** $\mu_1 = 1046,\ s_1^2 = 1818.11$ and $\mu_2 = 997.75,\ s_2^2 = 1200.21$

b Critical value is $F_{8,7} = 3.73$

$$F_{\text{test}} = \frac{1818.111}{1200.21} = 1.5148$$

not in critical region

accept H_0 – there is evidence to suggest that $\sigma_1^2 = \sigma_2^2$

c Use present supplier who appears to have a higher mean.