Chapter 14 / **Example 5**
Testing for the mean of a normal distribution

A machine fills bags of flour with a labelled weight of 1 kg. To make sure the bags are being filled correctly a sample of 40 is taken and their weights measured. The sample mean is found to be 995 g. From past experience it is known that the standard deviation of the bags filled by the machine is 20 g.

a Use the p-value to test whether there is sufficient evidence at the 5% level that the machine is filling the bags to less than the correct weight.

b Find the critical region for the test.

H_0: $\mu = 1000$, H_1: $\mu < 1000$

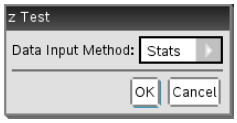
To calculate the p-value

Open a new document and add a Calculator page.

Press menu 6:Statistics | 7:Stat Tests | 1:z Test…

Choose Input Method: Stats

Press enter.



$\mu_0 = 1000$

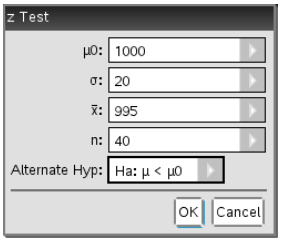
$\sigma = 20$

$\bar{x} = 995$

$n = 40$

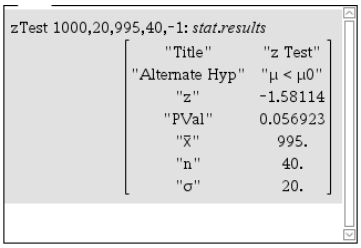
Ha: $\mu < \mu_0$

Press enter.



p-value is $P(\bar{X} < 995) = 0.0569$

0.0569 > 0.05, not significant so insufficient evidence to reject H_0 that the bags are being filled to the correct average weight.



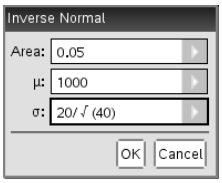
Press menu 5:Probability | 5:Distributions | 3:Inverse Normal…

Area = = 0.05

$\mu = 1000$

$\sigma = 20 \div \sqrt{40}$

Press enter.



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The critical region is $\bar{X} = 994.8$