

#### #4 Solution

Let  $X$  = old tree diameters  $\rightarrow X \sim N(\mu=5, \sigma=0.5)$

$Y$  = new tree diameters  $\rightarrow Y \sim N(\mu=3.8, \sigma=0.5)$   
(affected by drought)

Find cut off:

Bottom 5% of trees  $P(X \leq c) = 0.05$

From z-table  $P(Z \leq c^*) = 0.05$  when  $c^* = -1.64$

Now convert to  $X$ ,  $X = \sigma c^* + \mu$

$$X = 0.5(-1.64) + 5 = 4.18$$

What percent of new trees are below cut off?

$$P(Y \leq 4.18) = P\left(\frac{Y - \mu}{\sigma} \leq \frac{4.18 - 3.8}{0.5}\right) = P(Z \leq 0.76) = 0.7764$$

$\rightarrow 77.64\%$  of new trees need to be flagged.