Environment Setup Instructions

- **Reading:** Setting Up Your Programming Assignment Environment
  8 min
- **Reading:** Access MATLAB Online and Upload the Exercise Files
  3 min
- **Reading:** Installing Octave on Windows
  3 min
- **Reading:** Installing Octave on Mac OS X (10.10 Yosemite and 10.9 Mavericks and Later)
  10 min
- **Reading:** Installing Octave on Mac OS X (10.8 Mountain Lion and Earlier)
  3 min
- **Reading:** Installing Octave on GNU/Linux
  7 min
- **Reading:** More Octave/MATLAB resources
  10 min

Multivariate Linear Regression

- **Video:** Multiple Features
  8 min
- **Reading:** Multiple Features
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- **Video:** Gradient Descent for Multiple Variables
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- **Reading:** Gradient Descent For Multiple Variables
  2 min
- **Video:** Gradient Descent in Practice I - Feature Scaling

Gradient Descent For Multiple Variables

Gradient Descent for Multiple Variables

The gradient descent equation itself is generally the same form; we just have to repeat it for our 'n' features:

$$
\begin{aligned}
&\text{repeat until convergence: } \{ \\
&\theta_0 := \theta_0 - \alpha \frac{1}{m} \sum_{i=1}^{m} (h_\theta(x^{(i)}) - y^{(i)}) \cdot x_0^{(i)} \\
&\theta_1 := \theta_1 - \alpha \frac{1}{m} \sum_{i=1}^{m} (h_\theta(x^{(i)}) - y^{(i)}) \cdot x_1^{(i)} \\
&\theta_2 := \theta_2 - \alpha \frac{1}{m} \sum_{i=1}^{m} (h_\theta(x^{(i)}) - y^{(i)}) \cdot x_2^{(i)} \\
&\cdots \\
&\}
\end{aligned}
$$

In other words:

$$
\begin{aligned}
&\text{repeat until convergence: } \{ \\
&\theta_j := \theta_j - \alpha \frac{1}{m} \sum_{i=1}^{m} (h_\theta(x^{(i)}) - y^{(i)}) \cdot x_j^{(i)} \qquad \text{for j} := 0. \\
&\}
\end{aligned}
$$

The following image compares gradient descent with one variable to gradient descent with multiple variables: