Answer: The objective function $J(\theta) = \frac{1}{2}\sum[h_\theta(\hat{x}^{(i)}) - y^{(i)}]^2 = \frac{1}{2}\sum[\theta^T\hat{x}^{(i)} - y^{(i)}]^2$. This has gradient $\nabla_\theta J(\theta) = \sum(\theta^T\hat{x}^{(i)} - y)\hat{x}^{(i)}$. Thus the update rule for linear regression gradient descent is $\theta \mapsto \theta - \alpha\nabla J(\theta)$ in order to minimise the objective function.