**Problem**

Consider a two-dimensional function, . Determine the gradient of the function at point (2,3) and calcualte the sum of the rates of change in the x and y directions at the same point.

**Solution**

The gradient of this function would be a vector containing the partial derivatives with respect to *x* and *y*.

For our function the partial derivatives are:

Therefore the gradient of :

This gradient vector tells us the rate of change of the function in the *x* direction and the *y* direction at any given point (*x*,*y*). Our point is (2,3):

This tells us that the rate of change of the function is 4 in the *x* direction and 6 in the *y* direction at the point (2,3). So, the sum requested is:

4 + 6 = **10**

**Answer: 10**