29. $f(x,y) = x^2+y^2$

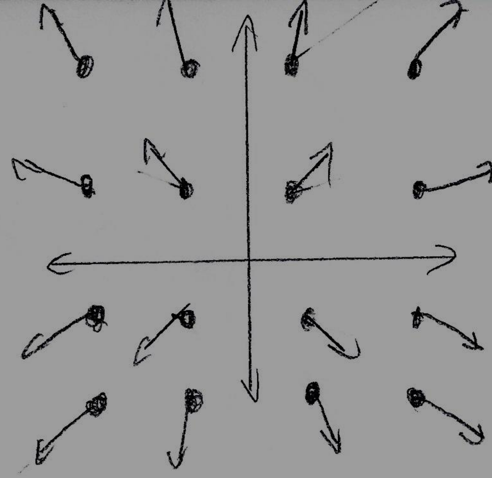
$\nabla f(x,y) = \langle 2x, 2y\rangle$

$\nabla f(1,1) = \langle 2,2\rangle$ $\nabla f(1,-1) = \langle 2,-2\rangle$

$\nabla f(2,2) = \langle 4,4\rangle$ $\nabla f(2,-2) = \langle 4,-4\rangle$

$\nabla f(1,2) = \langle 2,4\rangle$ $\nabla f(1,-2) = \langle 2,-4\rangle$

$\nabla f(2,1) = \langle 4,2\rangle$ $\nabla f(2,-1) = \langle 4,-2\rangle$



Graph III shares the most similarity with the above graph. Therefore the graph corresponding to $\langle 2x, 2y\rangle$ is graph III

31. $f(x,y) = (x+y)^2$

$\nabla f(x,y) = \langle 2x+2y, 2x+2y\rangle$

$\nabla f(1,1) = \langle 4,4\rangle$ $\nabla f(1,2) = \langle 6,6\rangle$

$\nabla f(2,2) = \langle 8,8\rangle$ $\nabla f(2,1) = \langle 6,6\rangle$

$\nabla f(1,-1) = \langle 0,0\rangle$ $\nabla f(1,-2) = \langle -2,-2\rangle$

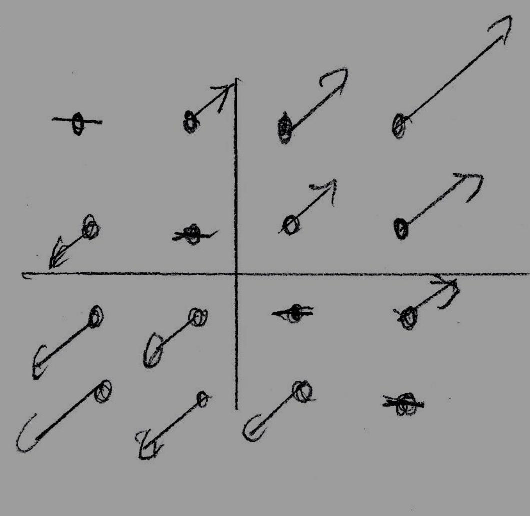
$\nabla f(2,-2) = \langle 0,0\rangle$ $\nabla f(2,-1) = \langle 2,2\rangle$

$\nabla f(-1,1) = \langle 0,0\rangle$ $\nabla f(-1,2) = \langle 2,2\rangle$

$\nabla f(-2,2) = \langle 0,0\rangle$ $\nabla f(-2,1) = \langle -2,-2\rangle$

$\nabla f(-1,-1) = \langle -4,-4\rangle$ $\nabla f(-1,-2) = \langle -6,-6\rangle$

$\nabla f(-2,-2) = \langle -8,-8\rangle$ $\nabla f(-2,-1) = \langle -6,-6\rangle$



Graph II shares the most similarity with the above graph therefore every vector on graph 3 corresponds to $\langle 2x+2y, 2x+2y\rangle$