

# Honors Calculus, Math 1451- HW 5 due Tuesday March 22)

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(1) Directional derivatives and the gradient vector (Section 4.6)

Questions in 14.6: 6, 8, 12, 28, 37, 51

(2) Maximum and Minimum Values (Section 14.7)

Questions in 14.7: 6, 12, 16, 23, 30, 34, 40, 54

(3) Lagrange multipliers (Section 14.8)

Questions in 14.8: 6, 8, 10, 14, 46

(4) Suppose product  $A$  costs 11 euros per unit and product  $B$  costs 3 euros per unit. Both are needed to produce product  $C$ . When  $x$  units of  $A$  and  $y$  units of  $B$  are used the total number of units of  $C$  produced by the production process is:

$$f(x, y) = -3x^2 + 10xy - 3y^2$$

How many units of  $A$  and  $B$  should be used to produce 80 units of product  $C$  and minimize the costs?