Name _____

56:271 Nonlinear Programming
Quiz #6 – Fall 2003

1. ***GRG*** is an acronym meaning ***G***_____ ***R***_____ ***G***_____ algorithm.

	a. golden	d. relative	d. golden
	b. gradient	b. removal	b. gradient
	c. generalized	c. regression	c. generalized
	d. Gaussian	e. resource	e. Gaussian
	e. geometric	a. reduced	a. geometric
	f. graphical	f. rank	f. graphical

__ 2. The function f(x,y) = xy is a …

a. concave function b. convex function c. linear function
d. separable function e. none of the above

True (+) or false (o)?

___3. A function which is not convex is called "concave".
___4.The sum of two convex functions is convex.
___5.The product of two convex functions is convex.
___6.A linear function is both convex and concave.
___7.A positive definite matrix always has all positive elements, although a matrix whose elements are positive need not be positive definite.
___8.The "dependent" variables of the GRG algorithm are comparable to the "basic" variables of the LP simplex algorithm.
___9. In each iteration of the GRG algorithm, the values of several independent variables may be changed simultaneously.
___10.The GRG algorithm requires that dependent variables be at neither their upper nor lower bounds.
___11.A differentiable function is convex if and only if its Hessian matrix is non-negative.
___12. KKT are the initials of Karl K. Tucker, who developed necessary and sufficient conditions for constrained optimization.
___13. If constraints are linear, there is no need to re-partition the variables (dependent and independent) during the iterations of the GRG algorithm.
___14. The GRG algorithm uses a quadratic approximation of nonlinear objective functions.
___15. The GRG algorithm requires a dependent variable for each equality constraint.
___16. No line searches (i.e., one-dimensional searches) are used in the GRG algorithm.
___17. If GRG were applied to a linear programming problem, it would be identical to the simplex method.
___18. If $g_i\left(x^0\right)=0$ then x^0 is feasible in the constraint $g_i(x)\le 0$ and at x^0, $\nabla g_i\left(x^0\right)$ is a direction pointing into the feasible region.
___19. If x^0 is optimal in the problem "minimize $f(x)$ s.t. $g(x)\le 0$", then the vectors $\nabla f\left(x^0\right)$ and $\nabla g\left(x^0\right)$ point in opposite directions.
___20. In each iteration of the GRG algorithm, the partition (into dependent & independent variables) is changed.