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Apm236h1f 2015
Problems 3

1. Let f,g be two convex functions from R^n to R. Let c be a real number. Show that:

(a) f+g is convex.

(b) If c>0, then cf is convex.

2. Convert the following problems to linear programming problems (l.p.p.'s):

(a) minimize $2x+3|y-10|$
subject to $x+y<=3$

(b) minimize $\max\{-x,1,x\}$
subject to $x>=5$

(c) minimize the largest residual (a residual is the prediction error at the ith data point) given the 3 data points A=(3/4,1), B=(7/4,3), C=(11/4,3), and assuming that your function is linear (that is of the form y=mx). (At the end, make sure to state your decision variables).

3. Solve the following lpp's.

(a)

**Maximize** $z=x+y$
subject to $2x+y<=8$
$x+3y<=9$
$x>=0, y>=0$

(b) Same problem as in (a), but Minimize.