Read each problem **very carefully** before starting to solve it. Each problem is worth 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. A page of 96 square inches is to have margins of 1 inch on either side and 1.5 inches at the top and bottom, as in the figure. Find the dimensions of the page that maximize the print area.

$1\frac{1}{2}$ "

1"

print area

total area:
96 in.^{2}
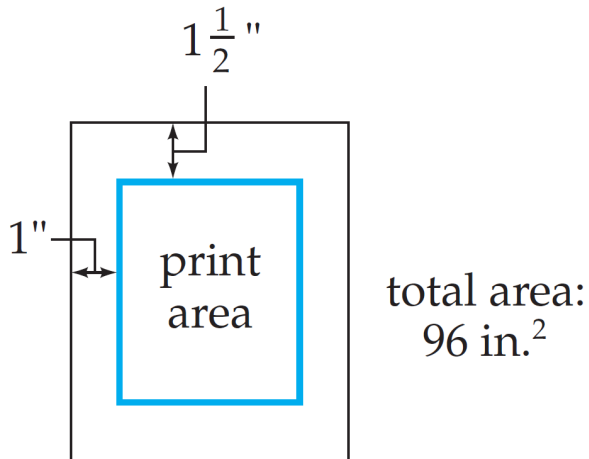
2. An oil producing country can sell 5 million barrels of oil a day at a price of $50 per barrel. Their market analysis showed that each $1 price increase will result in a sales decrease of 50,000 barrels per day. Let x be the number of $1 price increases that they decide to make.

(a) Write an equation of the price per barrel as a function of x:

$p(x) =$

(b) Write an equation for the number of barrels per day sold as a function of x:

$q(x) =$

(c) Write an equation for the daily oil revenue of the country as a function of x:

$R(x) =$

(d) Find the price that will maximize the country's daily oil revenue.

(e) Find the number of barrels that will be sold at the revenue-maximizing price.