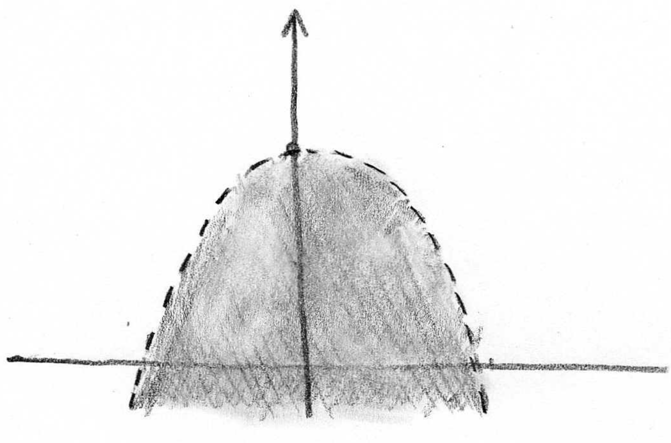
Systems of Inequalities (§ 6.5)

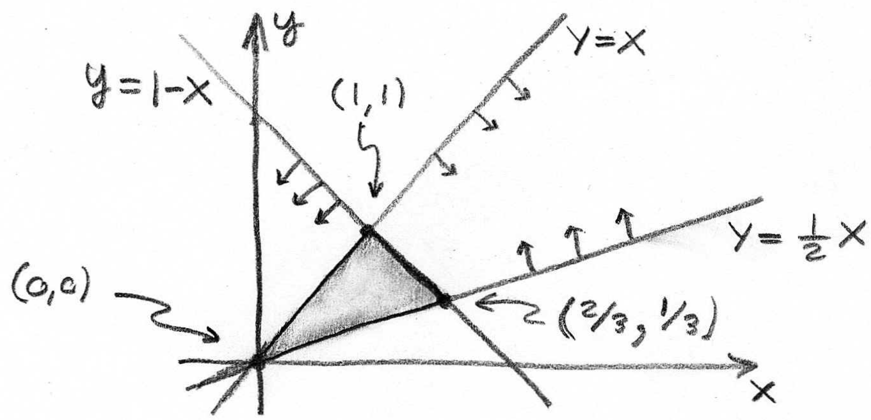
We take a purely graphical approach.

$\boxed{E220}$ Graph the region described by $y < 2 - x^2$



$y = 2 - x^2$ is parabola that opens down and has x-intercepts $\pm\sqrt{2}$ we draw dashed line to reflect the "<"

$\boxed{E221}$ Graph the region described by $y \le x$ and $y \ge \frac{1}{2}x$ and $y \le 1 - x$. To do this we graph the lines $y = x$, $y = \frac{1}{2}x$ and $y = 1 - x$



$$\tfrac{1}{2}x = 1 - x$$
$$\tfrac{3}{2}x = 1$$
$$x = 2/3$$

Linear Programming: (§ 6.6) (in a nut-shell)

Given $z = f(x, y)$ subject to constraints (like E221) the maximum/minimum values will occur at the vertices of the constraint region. Suppose the number of wigits f is function of x and y as in $\boxed{E221}$ and $f(x,y) = 1 - xy$ then we can just check the corners,

$$\left.\begin{aligned} f(0,0) &= 1 \\ f(1,1) &= 1 - 1 = 0 \\ f(2/3, 1/3) &= 1 - \tfrac{2}{9} = \tfrac{7}{9} \end{aligned}\right\} \boxed{\begin{array}{l}\text{max wigits produced for} \\ \quad x = 0 \text{ and } y = 0 \\ \text{min wigits at } x = 1,\ y = 1\end{array}}$$