11.7 (25) \( f(x,y) = x^2 + y^2 + x^2y + 4, \quad D = \) 

\[ f_x = 2x + 2xy = 0 \quad \Rightarrow \quad x = 0 \text{ or } y = -1 \]
\[ f_y = 2y + x^2 = 0 \quad \Rightarrow \quad y = 0 \quad (x = \pm \sqrt{2}) \text{ not in } D. \]

Only interior critical point is \((0,0)\), and \(f(0,0) = 4\).

Along edge OA: \(\{x = 1, -1 \leq y \leq 1\} \quad \Rightarrow \quad f(x,y) = f(1,y) = y^2 + y + 5\).

Along edge OB: \(\{-1 \leq x \leq 1, y = 1\} \quad \Rightarrow \quad f(x,y) = f(x,1) = 2x^2 + 5\).

Along edge OC: \(\{-1 \leq x \leq 1, y = -1\} \quad \Rightarrow \quad f(x,y) = f(x,-1) = 5 \quad \text{(constant)}.

So, here are all potential extrema:

\[ \text{abs. max of } f \text{ on } D \text{ is } f(-1,1) = f(1,1) = 7 \]
\[ \text{abs. min of } f \text{ on } D \text{ is } f(0,0) = 4. \]

(33): Minimize \( d^2 = (x-1)^2 + (y-2)^2 + (z-0)^2 \) subject to \( z^2 = x^2 + y^2 \).

\[ d^2 = x^2 + 8x + 16 + y^2 - 4y + 4 + 2z^2 = 2x^2 + 2y^2 - 8x - 4y + 20. = f(x,y). \]

\[ f_x = 4x - 8 = 0 \quad \Rightarrow \quad (x,y) = (2,1). \quad \text{So } z = \pm \sqrt{2^2 + 1^2} = \pm \sqrt{5}. \quad \text{So should be} \]
\[ (2,1,\sqrt{5}) \text{ and } (2,1,-\sqrt{5}). \]

(Intuition tells us \( f \) has min. at these pts.)

(34) Minimize \( d^2 = x^2 + y^2 + z^2 \) s.t. \( y = 2x \).

\[ f_x = 2x + 2z = 0, \quad f_y = 2y + x^2 = 0 \quad \Rightarrow \quad (x,y) = (0,0). \quad \text{So } (0,0,3) \text{ and } (0,0,-3). \]

(again, intuition will suffice for verification that these are minima. Though we could check: \( D(0,0) = (2)(3) - (1)^2 = 5 \), so any cost pt. yields a min.)