Find points at which graph has a horizontal or vertical tangent line.

$$4x^2 + y^2 - 8x + 4y + 4 = 0$$

$$8x + 2y\frac{dy}{dx} - 8 + 4\frac{dy}{dx} = 0$$

$$\frac{dy}{dx}(2y+4) = -8x + 8$$

$$\frac{dy}{dx} = \frac{-8x+8}{2y+4} = \frac{-8(x-1)}{2(y+2)} = \frac{-4(x-1)}{y+2}$$

HT:

$$-4(x-1) = 0$$
$$x = 1$$

$$4(1)^2 + y^2 - 8 + 4y + 4 = 0$$
$$4 + y^2 - 8 + 4y + 4 = 0$$
$$y^2 + 4y = 0$$
$$y(y+4) = 0$$
$$y = 0, -4$$

$(1, 0)$
$(1, -4)$

VT:

$$y + 2 = 0$$
$$y = -2$$

$$4x^2 + 4 - 8x - 8 + 4 = 0$$
$$4x^2 - 8x = 0$$
$$4x(x-2) = 0$$
$$x = 0, 2$$

$(0, -2)$
$(2, -2)$