

Section 2.2 #52

$$52. \quad y' = \frac{d}{dx} [x^3 + 3x^2]$$
$$= 3x^2 + 6x$$

Tangent line is horizontal means that y' (i.e. the slope of the graph) is zero at that point.

Solving

$$y' = 3x^2 + 6x = 0$$

for x , we have

$$3x^2 + 6x = 0$$

or

$$3x(x+2) = 0$$

or

$$x = 0 \quad \text{or} \quad x = -2$$

$$\text{When } x = 0, \quad y = 0^3 + 3 \cdot 0^2 = 0$$

$$\text{When } x = -2, \quad y = (-2)^3 + 3(-2)^2 = 4$$

so points are $(0, 0)$ and $(-2, 4)$