

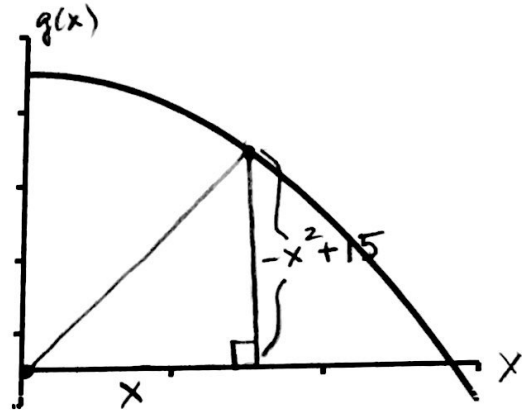
- (5) The hypotenuse of a right triangle has one end at the origin and one end on the curve $g(x) = -x^2 + 15$, with $x \geq 0$. One of the other two sides is on the x-axis, the other side is parallel to the y-axis. Find the dimensions of the triangle that gives the maximum area of the triangle.

[AS ALWAYS, SHOW ALL WORK AND GIVE EXACT ANSWER]. [20 POINTS]

$$A = \frac{1}{2}x(-x^2 + 15)$$

$$A = -\frac{1}{2}x^3 + \frac{1}{2} \cdot 15x$$

$$\frac{dA}{dx} = -\frac{3}{2}x^2 + \frac{15}{2} = 0$$



$$\left(\frac{2}{3}\right) + \frac{3}{2}x^2 = + \frac{15}{2} \cdot \frac{2}{3}$$

$$x^2 = 5$$

$$x = \sqrt{5}$$

$$\frac{d^2A}{dx^2} = -3x$$

$$\frac{d^2A}{dx^2} \Big|_{x=\sqrt{5}} = -3\sqrt{5} < 0 \quad \therefore x = \sqrt{5} \text{ IS A L. MAX}$$