Answer on Question #47587 - Math - Calculus

1 Task

The diagram shows the curve $y(x) = 6x - x^2$ and the line $y(x) = 5$. Find the area of the shaded region.

2 Solution

The area between and on the interval $[a, b]$.
We are also going to assume that $f(x) > g(x)$.

$$A = \int_a^b \{f(x) - g(x)\}dx$$

For this example:

$$f(x) = 6x - x^2$$

$$g(x) = 5$$

The points of the intersection can be found from

$$5 = 6x - x^2$$

After solving this equation, we get 2 answers x_1 *and* x_2

$$x_1 = a = 1, x_2 = b = 5$$

$$A = \int_1^5 \{6x - x^2 - 5\}dx = (3x^2 - \frac{x^3}{3} - 5x|_1^5) = \frac{32}{3}$$

3 Answer

The the area of the shaded region(between a = 1 and b = 5) is $\frac{32}{3} \approx 10.7$