



Quiz # 07  
Math 101 Section 07 Calculus I  
28 November 2024 Thursday  
Instructor: Ali Sinan Sertöz  
**Solution Key**

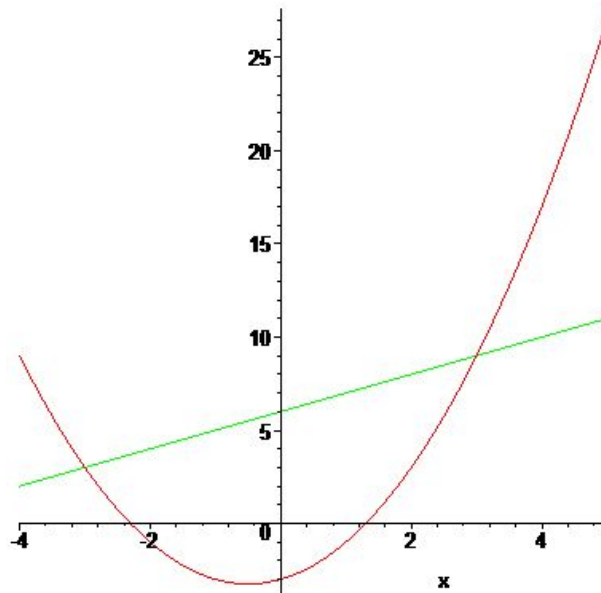
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**Q-1)** Find the area between the curves  $y = x^2 + x - 3$  and  $y = x + 6$  on the interval  $[-4, 5]$ .

Grading: 10 points

**Solution:** Grader: `gunes.akbas@bilkent.edu.tr`



Set  $f(x) = x^2 + x - 3$  and  $g(x) = x + 6$ .

The intersection points are found by solving  $f(x) = g(x)$ . This gives  $x^2 - 9 = 0$  and hence  $x = -3$  and  $x = 3$ .

The required area is then found as follows.

$$\begin{aligned} \text{Volume} &= \int_{-4}^{-3} [f(x) - g(x)] dx + \int_{-3}^3 [g(x) - f(x)] dx + \int_3^5 [f(x) - g(x)] dx \\ &= \left( \frac{1}{3}x^3 - 9x \Big|_{-4}^{-3} \right) + \left( 9x - \frac{1}{3}x^3 \Big|_{-3}^3 \right) + \left( \frac{1}{3}x^3 - 9x \Big|_3^5 \right) \\ &= \frac{10}{3} + 36 + \frac{44}{3} \\ &= 54. \end{aligned}$$