MAT126.R01: QUIZ 2

Let $f(x) = 2x$.

Let $g(x)$ be a function such that $\int_0^5 g(x)\, dx = 8$ and $\int_3^5 g(x)\, dx = 1$.

(a) Compute $\int_0^3 f(x)\, dx$

This integral is the area of the region between the graph of $f(x) = 2x$ and the x-axis. The region is a triangle with the base $3 - 0 = 3$ and the height $2(3) - 2(0) = 6$. Therefore its area is $\dfrac{3 \cdot 6}{2} = 9$.

(b) Compute $\int_0^3 g(x)\, dx$

Since $\int_0^5 g(x)\, dx = \int_0^3 g(x)\, dx + \int_3^5 g(x)\, dx$, we have that $\int_0^3 g(x)\, dx = \int_0^5 g(x)\, dx - \int_3^5 g(x)\, dx = 8 - 1 = 7$.

(c) Compute $\int_0^3 2f(x) + g(x)\, dx$

$\int_0^3 2f(x) + g(x)\, dx = 2\int_0^3 f(x)\, dx + \int_0^3 g(x)\, dx = 2(9) + 7 = 25$.