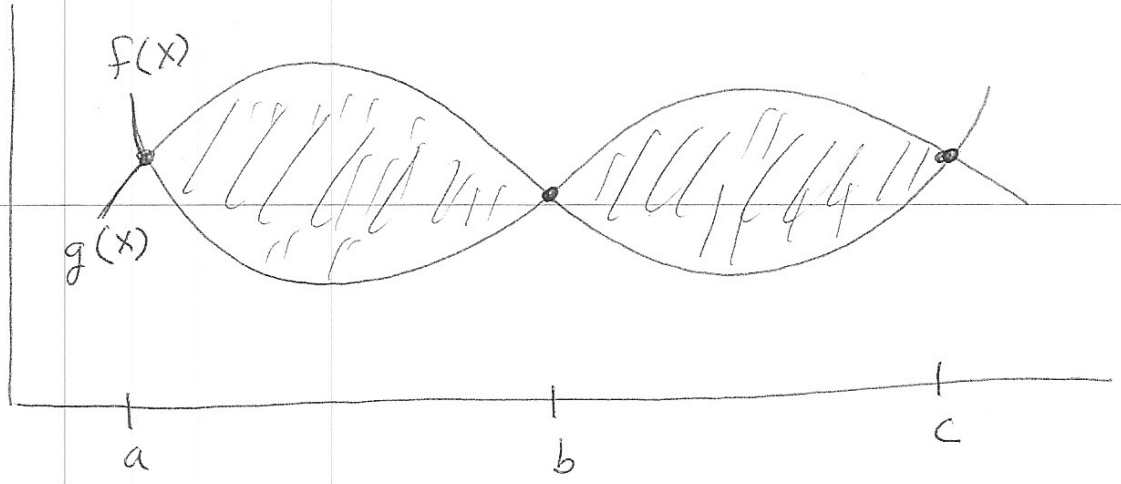
4.4 Properties of Definite Integrals

Find the area between the x-axis & $f(x)$ on $[-5, 6]$ if $f(x) =$

$$\begin{cases} 5, & x \leq 2 \\ x^2+1, & x > 2 \end{cases}$$

Area between curves



$$A = \int_a^b [g(x) - f(x)]\,dx + \int_b^c [f(x) - g(x)]\,dx$$

Find the area bounded by

$y = -x^2 + 3x$ and $y = 2x^3 - x^2 - 5x$

Find the area bdd by

$f(x) = 9 - x^2$, $g(x) = 15$, $x = -2$, and $x = 2$.

If the rate of car A is $R(t) = 60$ mph after t hours, and the rate of car B is $r(t) = 45$ mph after t hours, how much more distance did car A gain between the 1st and 5th hour? What if $R(t) = 30\sqrt[3]{t}$ and $r(t) = 20\sqrt{t}$? ~~On average,~~ what is the average speed of car A on $[1, 5]$? ~~#~~ Average speed of car B?

Average Value of a continuous function $f(x)$ on $[a, b]$ is

$$\frac{\int_a^b f(x)\,dx}{b-a}$$

Simulation: Consider $f(x) = x^2$ on $[4, 10]$. $\Rightarrow y \in [16, 100]$.

plug in 500 random numbers from $[4, 10]$ into $f(x)$ then find average. Use formula to find average.

Find the average value of the function $f(x) = 5 - 2x + 3x^3 - x^4$ on $[-1, 2]$.