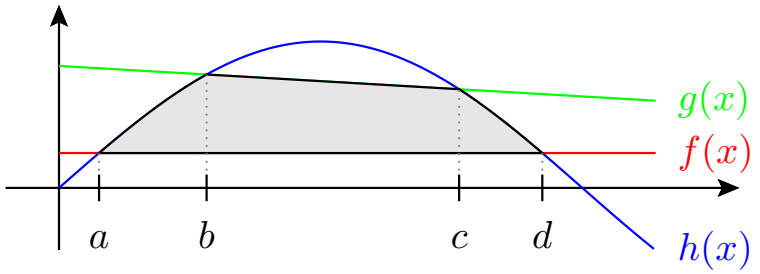
Quiz #1

MATH 126 — Calculus II
Friday, Aug 28

Please print your name:

Problem 1. Consider the plot below. What is the area enclosed by the curves $y=f(x)$, $y=g(x)$ and $y=h(x)$? Your answer should be a sum of certain integrals.



Solution. The area is

$$\int_a^b [h(x)-f(x)]\mathrm{d}x + \int_b^c [g(x)-f(x)]\mathrm{d}x + \int_c^d [h(x)-f(x)]\mathrm{d}x.$$

□

Problem 2. Evaluate the following indefinite integral:

$$\int \frac{\sin(t)}{2-\cos(t)}\,\mathrm{d}t$$

Solution. We substitute $u=2-\cos(t)$. Since

$$\frac{\mathrm{d}u}{\mathrm{d}t} = \sin(t),$$

we use $\sin(t)\,\mathrm{d}t = \mathrm{d}u$ to get

$$\int \frac{\sin(t)}{2-\cos(t)}\,\mathrm{d}t = \int \frac{1}{u}\,\mathrm{d}u = \ln|u| + C = \ln|2-\cos(t)| + C.$$

□

Armin Straub
straub@southalabama.edu