## Math 1552, Integral Calculus

## Section 5.6: Area Between Curves

1. Suppose that $y=f(x)$ and $y=g(x)$ are both continuous functions on the interval $[a, b]$. Determine if each statement below is always true or sometimes false.
(a) Suppose that $f(c)>g(c)$ for some number $c \in(a, b)$. Then the area bounded by $f, g$, $x=a$, and $x=b$ can be found by evaluating the integral $\int_{a}^{b}(f(x)-g(x)) d x$.
(b) If $\int_{a}^{b}(f(x)-g(x)) d x$ evaluates to -5 , then the area bounded by $f, g, x=a$, and $x=b$ is 5 .
(c) If $f(x)>g(x)$ for every $x \in[a, b]$, then $\int_{a}^{b}|f(x)-g(x)| d x=\int_{a}^{b}(f(x)-g(x)) d x$.
2. Find the area bounded by the region between the curves $f(x)=x^{3}+2 x^{2}$ and $g(x)=$ $x^{2}+2 x$.
3. Find the area bounded by the region enclosed by the three curves $y=x^{3}, y=-x$, and $y=-1$.
4. Find the area bounded by the curves $y=\cos x$ and $y=\sin (2 x)$ on the interval $\left[0, \frac{\pi}{2}\right]$.
5. Find the area of the triangle with vertices at the points $(0,1),(3,4)$, and $(4,2)$. USE CALCULUS.

## Answers

1. (c) is true 2. $\frac{37}{12}$
2. $\frac{5}{4}$ 4. $\frac{1}{2}$ 5. 4.5
