MATH 1300: HW #15

Due on May 4, 2017 at 10:00am

Professor Braden Balentine Section 005

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Section 5.4

6. Sketch the area represented by $g(x)$. Then find $g'(x)$ in two ways: (a) by using the Part 1 of the Fundamental Theorem and (b) by evaluating the integral using Part 2 and then differentiating.

$$g(x) = \int_0^x (1 + \sqrt{t})dt$$

18. Use Part 1 of the Fundamental Theorem of Calculus to find the derivative of the function.

$$y = \int_{\sin x}^{\cos x} (1 + v^2)^{10} dv$$

23. On what interval is the curve

$$y = \int_0^x \frac{t^2}{t^2 + t + 2} dt$$

30. Let

$$f(x) = \begin{cases} 0 & \text{if } x < 0 \\ x & \text{if } 0 \leq x \leq 1 \\ 2 - x & \text{if } 1 < x < 2 \\ 0 & \text{if } x > 2 \end{cases}$$

and

$$g(x) = \int_0^x f(t)dt$$

(a) Find an expression for $g(x)$ similar to the one for $f(x)$.

(b) Sketch the graphs of f and g.

(c) Where is f differentiable? Where is g differentiable?

Section 5.5

15. Evaluate the indefinite integral.

$$\int \frac{dx}{5 - 3x}$$

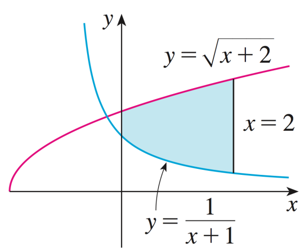
68. If f is continuous and $\int_0^9 f(x)dx = 4$, find $\int_0^3 xf(x^2)dx$.

70. If f is continuous on $\mathbb{R}$, prove that

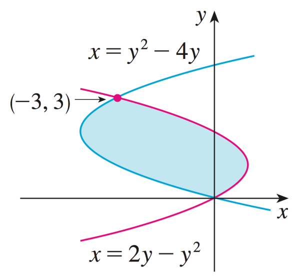
$$\int_a^b f(x + c)dx = \int_{a+c}^{b+c} f(x)dx$$

Section 6.1

2. Find the area of the shaded region.



4. Find the area of the shaded region.



10. Sketch the region enclosed by the given circles. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle and lable its height and width. Then find the area of the region.

$$4x + y^2 = 12, \qquad x = y$$