MA 137 Worksheet #27

Section 6.2

11/24/20

1. Suppose $\int_0^x f(t)dt = \sin(x)$. Then find the following integrals:

   (a) $\quad \int_0^\pi f(t)\,dt$

   (b) $\quad \int_{\pi/2}^\pi f(t)\,dt$

   (c) $\quad \int_\pi^{-\pi} f(t)\,dt$

2. Use the Fundamental Theorem of Calculus to find the derivative of the following functions:

   (a) $\quad f(x) = \int_x^1 (2 + t^4)^5\,dt$

   (b) $\quad g(x) = \int_0^{x^2} \sqrt[3]{1 + r^3}\,dr$

   (c) $\quad h(x) = \int_{\sqrt{x}}^{x^2} \sqrt{t}\sin(t)\,dt$

3. Find a $f(t)$ and a such that: $\qquad\qquad 6 + \int_a^x \dfrac{f(t)}{t^2}\,dt = 2\sqrt{x}.$

4. Use l'Hôpital's Rule to evaluate: $\qquad\qquad \displaystyle\lim_{x\to 0} \dfrac{\int_0^x e^t\,dt}{3x}.$

5. Find the following:

   (a) $\quad \int_{-2}^7 \dfrac{1}{x^5}\,dx$

   (b) $\quad \int_{-1}^1 e^{x+1}\,dx$

   (c) $\quad \int_{\pi/2}^\pi \left(1 + 2\sin(x) + \dfrac{3}{\sqrt{x}}\right)dx$