CALCULUS I – Worksheet #25

1. Find the area bounded by $y^2 = 4x$ and $y = 2x - 4$.

2. Find the area bounded by $y = 2 - x^2$ and $y = x - 4$.

3. Find the area under the curve $y = 2x + 1$ on $[0,2]$.

4. Find the average value of $f(x) = 5x^4 + 3x^2$ on the interval $-1 \le x \le 2$.

5. A circular conical reservoir has depth 20 feet and radius of the top 10 feet. Water is leaking out so that the surface is falling at the rate of $\frac{1}{2}\frac{\text{ft}}{\text{hr}}$ The rate, in cubic feet per hour, at which the water is leaving the reservoir when the water is 8 feet deep is
   (A) $4p$ (B) $8p$ (C) $16p$ (D) $\frac{1}{4p}$ (E) $\frac{1}{8p}$

6. Find c in $[-2,2]$ determined by Rolle's Theorem for $f(x) = x^4 - 4x^2$.

7. $f(x) = \begin{cases} \frac{x^3+8}{x+2} & \text{when } x \neq -2 \\ k & \text{when } x = -2 \end{cases}$ Find k so that f is continuous at $x = -2$

8. $\lim_{x \to -1} \frac{\sqrt{x^2+3} - 2}{x+1} =$ A) 0 B) –2 C) $-\frac{1}{2}$ D) 2 E) does not exist.

9. If $h(x) = \sqrt{x-4}$, then $h^{-1}(x) =$
   A) $\sqrt{x^2+4}$ B) $x^2 - 4$ C) $x + 4$ D) $\sqrt{x+4}$ E) $x^2 + 4$

10. If $y = \frac{1}{\sin(t + \sqrt{t})}$ then $y'(1) =$
    A) $-\frac{3}{2}\sin^2 2 \cos 2$ B) $-2\frac{\cos 2}{\sin^2 2}$ C) $-\frac{3\cos 2}{2\sin^2 2}$ D) $-\frac{1\cos 2}{2\sin^2 2}$ E) $-2\tan 2$