Calculus Quiz 2 Date: 2018/12/10 10:20-12:00 100 minutes Total: 100

1. **(a)** Identify the function's local extreme values in the given domain, and say where the occur. **(b)** Which of the extreme values, if any, are absolute? **(c)** Support your findings by a graph. (10 points)

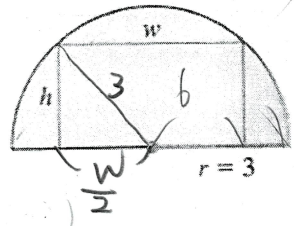
$y = \sqrt{25 - x^2}, -5 \le x \le 5$,

2. Graph the rational functions using all the steps in the graphing procedure. (12 points)

$y = \dfrac{x^4 + 1}{x^2}$

3. Determine the dimensions of the rectangle of largest area that can be inscribed in a semicircle of radius 3. (See accompanying figure.) (12 points)

$W = \sqrt{18}$ $h = \sqrt{4.5}$



4. $\int x^{\sqrt{2}-1}dx$ (6 points) $\frac{\sqrt{2}}{2} x^{\sqrt{2}} + C$

5. Graph each function $f(x)$ over the given interval. Partition the interval into four subintervals of equal length. Then add to your sketch the rectangles associated with the Riemann sum $\sum_{k=1}^{4} f(c_k)\ \Delta x_k$, given that c_k is the **(a)** left-hand endpoint, **(b)** right-hand endpoint, **(c)** midpoint of the kth subinterval. **(d)** Calculate its lower sum. (8 points)

$-2x+1$

$-\frac{?}{32}$

※ **(a) ~ (c) Make a separate sketch for each set of rectangles.**

$f(x) = -x^2, [0,1]$

$\int_{+1}^{-1} \sec(t-1)\,dt$

6. What values of a and b minimize the value of $\int_a^b (x^4 - 2x^2)dx$? (10 points)

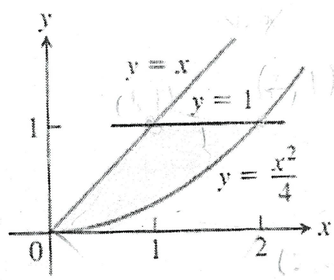
$\pm\sqrt{2}$

7. Find the linearization of $g(x) = 3 + \int_1^{x^2} \sec(t-1)\,dt$ at $x = -1$ (10 points)

~~$y=-2x+1$~~ $-2x+1$

8. $\int \frac{1}{x^3}\sqrt{\frac{x^2-1}{x^2}}\,dx$ (10 points) $\frac{1}{3}(1-x^2)^{\frac{3}{2}} + C$

9. Find the total areas of the shaded regions. (10 points) $\frac{5}{6}$



10. Find the areas of regions enclosed by the lines and curves. (12 points)

$x - y^2 = 0$ *and* $x + 2y^2 = 3$

4