Calculus I	**Name:**
Study Guide 20	**Class:**
Due Date:	**Score:**

No Work $\Leftrightarrow$ No Points

Use Pencil Only $\Leftrightarrow$ Be Neat & Organized

1. (5 points) At a certain instant each edge of a cube is 5 inches long and the volume is increasing at the rate of 2 ft^3/min. How fast the surface area of the cube increasing?

2. (4 points) If functions $f(x)$ and $g(x)$ are positive and increasing on an interval I. Show $h(x) = f(x) \cdot g(x)$ is increasing on the interval I.

2. _____

3. (4 points) Find $f(x)$ such that $f'(x) = 5x^4 + \sec x \tan x$ and $f(0) = 5$.

3. _____

4. (3 points) State the First Derivative Test clearly.

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5. (5 points) Find all relative extrema of $f(x) = -3x^{5/3} + 15x^{2/3}$.

5. _____

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6. (3 points) State the Second Derivative Test clearly.

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7. (5 points) Find all critical points and inflection points for $f(x) = x^4 - 6x^2 - 3$.

7. _____

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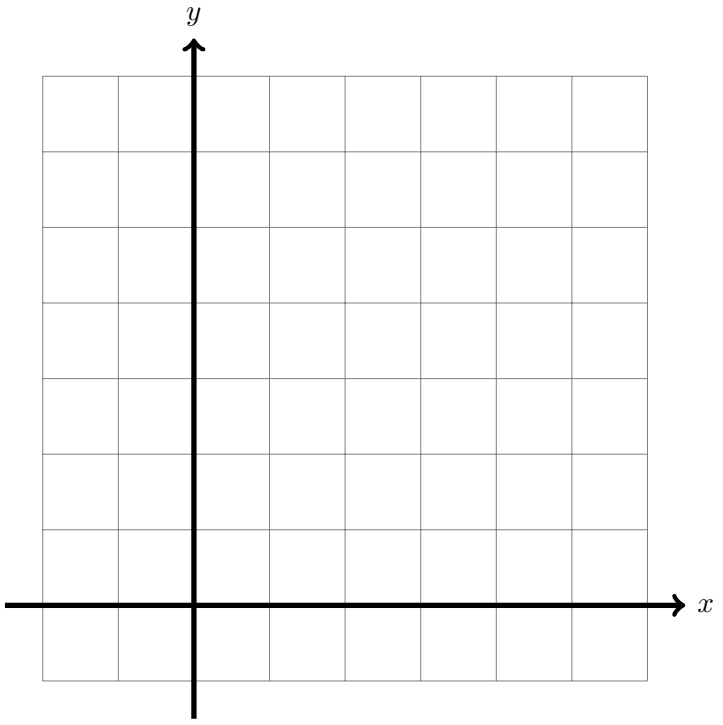
8. (5 points) A rectangle has its two lower conners on the $x-$axis and its two upper corners on the curve $y = 16 - x^2$, For all such rectangles, what are the dimensions of the one with the largest area? Drawing Required.

8. _____

9. (8 points) Graph $f(x) = 2\cos^2 x$ on $0 \leq x \leq \pi$. Make sure you show all steps as we did in class, label all your points, and clearly identify any critical points and inflection points.



10. (8 points) Graph $f(x) = \dfrac{x^2 - 4}{x^2}$. Make sure you show all steps as we did in class, label all your points, and clearly identify any critical points and inflection points.