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#40 REVIEW OF CHAPTER 5 AND 6

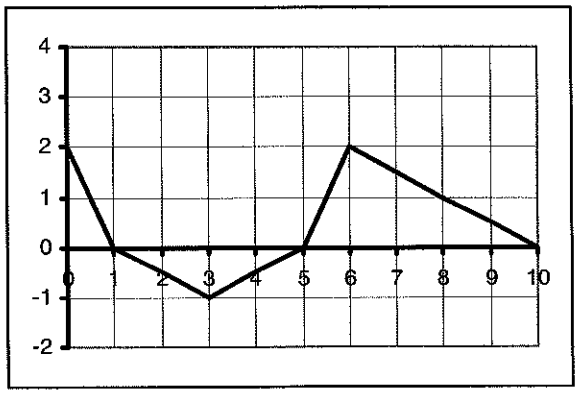
1. Suppose the rate at which a filter removes sediment from a tank is given by the data below. Find the upper and lower estimates for the amount of sediment removed during the first two hours. Use $N = 4$.

Time (hr)	0	.5	1	1.5	2
Rate of Sediment Removal (gr/hr)	3.5	8.2	9.0	7.5	5.3

2. Estimate the area of the region bounded by $f(x) = e^{-x^2}$, the x-axis, $x = 0$, and $x = 0.5$. Estimate the average value of $f(x)$ over the interval [0,0.5]. Include an illustration of these quantities.

3. Sketch the region bounded by the lines $y = 10$, $y = 3x$, and $x = 0$. Set up a definite integral to represent the area of this region. Use geometry to find the exact value of the definite integral.

4. Use the graph of $g'(x)$ given below to sketch a graph of $g(x)$ so that $g(0) = 0$. Include the x and y coordinates of any local extrema and inflection points.



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5. Use the Fundamental Theorem of Calculus to estimate $F(2)$ if $F(0)=1$ and $F'(x)=\sin(x^2)$.

6. Use the sketch of $f''(x)$ to determine where each of the following occurs. Assume $f'(0)=0$ and $f(0)=0$

A. $f''(x)$ is greatest $f''(x)$ is least

B. $f'(x)$ is greatest $f'(x)$ is least

C. $f(x)$ is greatest $f(x)$ is least