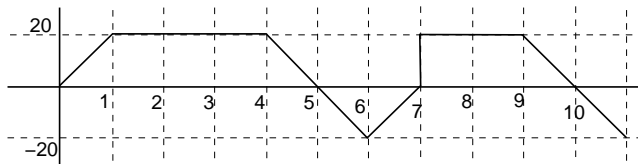


Exam # 3 Sample Review

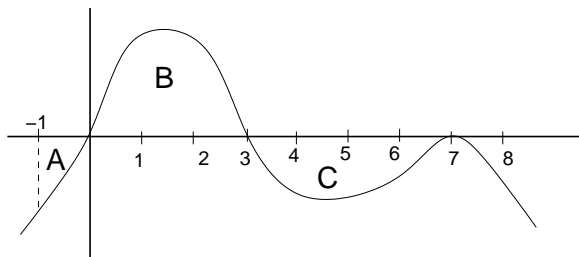
Sections 5.1-5.5, and 7.1-7.4

This collection of questions is intended to be a brief overview of the material on the exam. This is not intended to represent an actual exam. When studying, you should also look at the homework problems in the book as well as the other week in reviews for this material.

- A bat starts out traveling towards the exit of a tunnel 90 feet away. The graph describes the bat's velocity, $v(x)$ in ft/sec, vs. time.
 - What is the interpretation of $\int_1^4 v(x)dx$? give the units of the definite integral.
 - When does the bat change direction?
 - How far from the starting point is the bat after 6 seconds?
 - How far has the bat traveled in the 6 seconds?
 - Does the bat make it out of the tunnel in 10 seconds?



- The following is the graph of $f'(x)$. Use the fact that $f(0) = 40$ along with the given areas for the regions to answer the following. Region A = 8, Region B = 48, and Region C = 34.
 - Find the coordinates, (x,y) , for all of the critical values. Also classify the critical values.
 - Find the x-values for the inflection points.
 - Sketch the graph of $f(x)$.



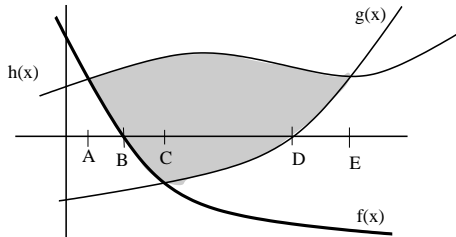
- Find the coordinates, (x,y) , for all of the critical values. Also classify the critical values.
 - Find the x-values for the inflection points.
 - Sketch the graph of $f(x)$.
- If x is the number of years from 1990, then the population growth of a city, in millions per year, can be modeled by the formula $1.5e^{0.25x}$.
 - Write an expression that will give the growth of the city A years after 1990.
 - If the city had a population of 5 million in 1990, find a formula that will give the population A years after 1990.
 - If $f'(x) = 5 \cos(3x^2)$ and $f(-1) = 2$ then find $f(1)$.

5. Compute $\int_J^5 \frac{2}{x^2} + \cos(3x) dx$

6. (a) Compute $\int_0^A \frac{x}{1+x^2} dx$

(b) Does $\int_0^\infty \frac{x}{1+x^2} dx$ converge or diverge?

7. Set up the integral(s) that represent this shaded area.



8. Find the value of B so that the area between the curves $f(x) = 2e^x$ and $g(x) = 3x^2$ from $x = 0$ to $x = B$ will be 110.

9. Compute these integrals

(a) $\int \frac{1}{2x^3} - \sin(6x) + \sqrt[3]{x} dx$

(b) $\int \frac{e^{x-1}}{x^2} dx$

(c) $\int \frac{5e^{5x} - 8e^{-8x}}{(e^{5x} + e^{-8x})^3} dx$

10. Compute the area between the x-axis and $y = e^x - 1$ from $x = -2$ to $x = 2$.

11. (a) Estimate $\int_1^9 \frac{1}{x} dx$ using a left-hand sum with 4 rectangles.

(b) Is the estimate an over estimate or an under estimate? Justify your answer with a graph.

12. Estimate $\int_1^{10} f(x) dx$ using a right sum and the information in the table.

x	1	4	8	10	11
f(x)	5	20	16	8	3