

Calculus 1

Review for exam #3 - sections 4.7

5.5 AND  
section 8.3

1. Find the point on the graph of  $y = \sqrt{x + 2}$  closest to (6,0).
2. An open box is made from a square piece of material, 8 inches on a side, by cutting squares from each corner and turning up the sides. Find the volume of the largest box that can be made.
3. The sum of 4 times a first number and 3 times a second number is 12. Maximize the product of the two numbers.
4. Use the method of differentials to approximate  $\sqrt{9.01}$ .
5. Find  $\frac{dy}{dx}$   
 a)  $y = \sin x \cos x$    b)  $y = [\cos(x^2) + 10]^3$    c)  $y = \sec(\sin x)$    ~~d)  $y = \tan(xy) + \sec x$~~

6.

a) $\int (3x^5 - 4x^3 - 7x + 2) dx =$	b) $\int \frac{5x^3 - 7x}{\sqrt{x}} dx =$
c) $\int (3x - 2)(x + 5) dx =$	d) $\int \frac{\sin x}{\cos^2 x} dx$
e) $\int x \sec(x^2) \tan(x^2) dx$	f) $\int \frac{x}{\sqrt{5x^2 + 4}} dx$
g) $\int \frac{1}{t^2} (3 + \frac{5}{t})^{10} dt$	h) $\int \frac{(5 - x^{\frac{2}{3}})^{10}}{\sqrt[3]{x}} dx$
i) $\int \frac{x}{\sqrt{x-1}} dx$	j) $\int \frac{x}{(x+1)^3} dx$

7. Evaluate the definite integrals: a)  $\int_0^{\pi/2} \sin x dx$    b)  $\int_0^1 (2x^2 - 5x) dx$
8. Find the area between:  $y = -x^2 + 4x$  and the  $x$ -axis.
9. Find the average of function  $y = 3x^2 + 1$  on the interval [1,3].
10. Find a)  $\frac{d}{dx} \int_1^x \sin t dt$    b)  $\frac{d}{dx} \int_1^{x^2} t^3 dt$
11.  $\lim_{x \rightarrow 0} \frac{\sin 5x}{x}$