

Calculus I / Final Exam Review Sheet

1. The following topics will be on this exam: limits (no Squeezing Thm), Derivatives & their applications (no graphing), rectilinear motion, and Sec 4.6, 4.9, 5.1-5.5 inclusive, 6.1. No related rate word problems. Review previous review sheets for previous material mentioned above.

2. Find:

a) $\int (u^5 - \frac{2}{\sqrt{u}} + \frac{7}{u}) du$ b) $\int \frac{t^4 + 3}{t^2} dt$ c) $\int_0^1 \frac{4}{x^2 + 1} dx$

d) $\int_0^{3\pi/2} |\sin x| dx$ e) $\int (5e^x - 2\sec^2 x + 1) dx$ f) $\int t^2 \cos(t^3) dt$

g) $\int_0^{\pi/2} \frac{\cos \theta}{1 + \sin \theta} d\theta$ h) $\int \cos^3(5x) \sin(5x) dx$ i) $\int x^2 \sqrt{x^3 + 5} dx$

j) $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$ k) $\int_0^2 \frac{1}{(3x+2)^2} dx$ l) $\frac{d}{dx} \left[\int_0^x \tan^2 t dt \right]$

3. Find the function f such that $f''(x) = 1 + 3\sin x$ & $f(0) = 0$, $f'(0) = 0$.

4. a) Express $1 + \frac{3}{4} + (\frac{3}{4})^2 + \dots + (\frac{3}{4})^n$ in summation (sigma) notation.

b) Find the value of $\int_{-2}^2 \sqrt{4-x^2} dx$ by interpreting it as an area under a curve & using a known formula from geometry. Sketch a picture of the area.

5. Given that $\int_{-1}^0 f(x) dx = 3$ and $\int_0^2 f(x) dx = -1$ evaluate

a) $\int_0^{-1} 8f(x) dx$ b) $\int_0^2 (f(y) + 3) dy$ c) $\int_{-1}^2 f(x) dx$

6. a) Find the area enclosed by $y = \frac{2}{x}$, $x=1$, $x=3$ & the x -axis. Sketch a picture of the area.

b) Find the area of the region in the 1st quadrant bounded above by $y=x^2$ and $y=2-x$ & below by the x -axis. sketch a picture of the area.

7. Text, p 375 #56 (Rectilinear Motion)

8. Review Max/Min Word Problem homework

9. Using the definition of the definite integral, find the area under the curve $y = x + 1$ over the interval $[0, 2]$. Use the right endpoints for your sample points x_1^* , x_2^* , \dots , x_n^* .