

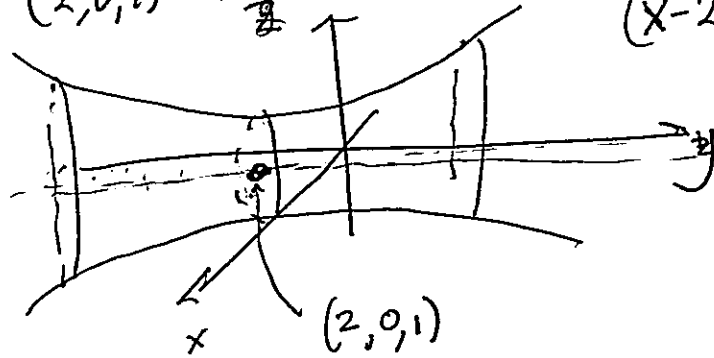
# SAMPLE FINAL SOLUTIONS

- 1(a) DIVERGES BY GENERAL TERM DIVERGENCE TEST  
 (b) CONVERGES CONDITIONALLY BY ALTERNATING SERIES TEST  
 (c) CONVERGES ABSOLUTELY BY INTEGRAL TEST

2.  $[-5, 3)$

3. HYPERBOLOID OF ONE SHEET CENTERED AT  $(2, 0, 1)$  WITH AXIS  $x=2, z=1$

$$(x-2)^2 + (z-1)^2 = y^2 + 5$$



NO VERTICES

4. (a)  $\sum_{n=0}^{\infty} \frac{x^{n+1}}{2^n} = x + \frac{x^2}{2} + \frac{x^3}{2^2} + \dots$

5.  $2 - \frac{\pi}{4}$

(b) 2

6.  $\int_1^{\infty} \frac{\cos^2 x}{1+x^2} dx$  CONVERGES

↑

COMPARISON  $\int_0^{\infty} \frac{dx}{1+x^2} = \arctan x \Big|_0^{\infty} = \pi/2$  CONVERG

7. 4

8.

~~$\frac{7}{7} \tan x + \frac{5}{5} \tan x + C$~~

$$\frac{1}{3} \tan^3 x - \tan x + x + C$$

9.  $\frac{1}{4} - \frac{3}{4} e^{-2}$

10.  $\frac{9}{2} \arcsin \frac{x}{3} - \frac{x}{2} \sqrt{9-x^2} + C$

$$11. 6 \ln 3 - \frac{10}{3}$$

$$12. \frac{2}{9} \cdot 2^{3/2}$$

$$13. 75/4$$

$$14. \frac{1}{2} \text{ life} = \frac{-8 \ln 2}{\ln 2 - \ln 3} \text{ days}$$

$$m(20) = 2 e^{r \cdot 20}$$

$$r = \frac{1}{8} \ln^2 \frac{2}{3}$$

15. (a) CONVERGES TO 0

(b) DIVERGES TO  $\infty$

$$16. x + \frac{x^2}{2} + \frac{5}{6}x^3 + \frac{7}{12}x^4$$

17. ERROR BOUND

$$\frac{(10^{-3})^3}{3!} = \frac{1}{6} 10^{-9}$$