

AMS 161-Final Exam Practice #2

NAME: _____

Each question is worth 20%.

1. Determine if each converges or diverges and justify:

a) $\sum_{n=1}^{\infty} \frac{7n!}{n^2}$

b) $\sum_{n=1}^{\infty} \frac{-1}{\sqrt{n^3}}$

$$\text{c) } \sum_{n=2}^{\infty} \frac{\ln n}{\sqrt{n}}$$

$$\text{d) } \sum_{n=1}^{\infty} 5\left(\frac{-3}{8}\right)^n$$

2. Find the interval of convergence for $\sum_{n=0}^{\infty} \frac{(-1)^n}{3^n(n+1)} x^n$

3.If the half-life of a radioactive substance is 10 years, how long will it take to decay by 60% assuming the rate of change of this substance is directly proportional to the SQUARE of the amount present? Derive any formulas you use by solving a differential equation!

4. Draw $y = F(x) = \int_2^x (1 - |t - 2|) dt$ with correct concavity.

5) Find the volume of the solid that results when the region enclosed by $y = \sqrt{x}$, $y = 0$, and $x = 9$ is revolved about $x = 9$.