

AMS 161-Final Exam Practice

NAME: _____

Each question is worth 20%.

1. Determine if each converges or diverges and justify:

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

b) $\sum_{n=1}^{\infty} \frac{-30}{n}$

$$\text{c) } \sum_{n=2}^{\infty} \frac{\ln n}{3n}$$

$$\text{d) } \sum_{n=1}^{\infty} \left(-\frac{9}{8}\right)^{n+2}$$

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

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 amount present? Derive any formulas you use by solving a differential equation!

4. Draw $y = F(x) = \int_1^x (-1 + |t + 2|)dt$ with correct concavity.

5) Derive the volume of a cone.

.