

Problem 1. In each part determine if the series is convergent or divergent. If it is convergent find the sum. (These are geometric or telescoping series.)

A.

$$\sum_{k=3}^{\infty} \frac{5}{2^k}.$$

B.

$$\sum_{k=1}^{\infty} 3e^k.$$

C.

$$\sum_{k=1}^{\infty} \frac{(-1)^{n+1} 2}{7^{2k}}.$$

D.

$$\sum_{k=3}^{\infty} \frac{1}{k(k+1)}.$$

Problem 2. In each part, express the given number as a single fraction.

A. $0.77\bar{7}$

B. $23.542121\bar{21}$

Problem 3.

A rubber ball is dropped from a height of 12 feet. After each bounce, the ball goes up to $3/4$ of the distance it previously fell. What is the total vertical distance traveled by the ball?

Problem 4. In each part, determine if the series is convergent or divergent.

Be sure to say which test you are using and to show the details of how the test is applied.

Part 1.

$$\sum_{k=1}^{\infty} e^{-3k}.$$

Part 2.

$$\sum_{k=1}^{\infty} \frac{1}{k^{2/3}}.$$

Part 3.

$$(3) \quad \sum_{k=1}^{\infty} \frac{k^2}{k^8 + k^5 + 7}.$$

Part 4.

$$\sum_{k=2}^{\infty} \frac{1}{k \ln(k)}.$$

Part 5.

$$\sum_{k=1}^{\infty} \frac{k^2}{2k^2 + 1}.$$

Part 6.

$$\sum_{k=1}^{\infty} \frac{k^3}{2^k}.$$

Part 7.

$$\sum_{k=1}^{\infty} \left(\frac{k}{2k+1} \right)^k.$$

Part 8.

$$(5) \quad \sum_{k=1}^{\infty} \frac{1}{\sqrt{2^k + k}}.$$

Part 9.

$$\sum_{k=1}^{\infty} \frac{2^k}{k!}.$$

Part 10.

$$\sum_{k=1}^{\infty} e^{-5/k}.$$

Part 11.

$$\sum_{k=1}^{\infty} \frac{3^{2k+1}}{(2k+1)!}.$$

Part 12.

$$\sum_{k=2}^{\infty} \frac{1}{[\ln(k)]^k}.$$

Part 13.

Problem 5. Assume that $x > 0$. In each case, find the set of all $x > 0$ for which the series converges.

A.

$$\sum_{k=1}^{\infty} \frac{x^k}{k!}$$

B.

(11)
$$\sum_{k=1}^{\infty} \frac{x^k}{k2^k}$$

EXAM

Practice for Third Exam

Math 1352-006, Fall 2003

Dec 1, 2003

- Write all of your answers on separate sheets of paper. You can keep the exam questions when you leave. You may leave when finished.
- You **must** show enough work to justify your answers. Unless otherwise instructed, give exact answers, not approximations (e.g., $\sqrt{2}$, not 1.414).
- This exam has 5 problems. There are **200 points total**.

Good luck!