Worksheet: Real series review

Directions. Close your books, turn off your phones, and work together to recover, from memory and your reasoning abilities, these ideas from calculus.

1. (a) Let a and r be real. Find a closed-form (i.e. without "...") expression for
$$a + ar + ar^2 + ar^3 + \cdots + ar^n$$

(b) When does the following geometric series converge? When it does, what is the sum?
$$\sum_{n=0}^{\infty} ar^n$$

2. Give an example of a convergent series of real numbers which is not absolutely convergent. Explain/justify/prove.

3. Use the integral test to show that this series converges:

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

4. Clearly and correctly state these convergence tests from calculus, for real series:

(a) comparison test:

(b) limit comparison test:

(c) integral test: