This print-out should have 8 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

001　10.0 points

Determine whether the series

$$\sum_{k=1}^{\infty} \frac{3}{k^7 + 8}$$

converges or diverges.

1. series is convergent

2. series is divergent

002　10.0 points

Determine whether the series

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

converges or diverges.

1. series is convergent

2. series is divergent

003　10.0 points

Which of the following series

(A) $\displaystyle\sum_{n=1}^{\infty} \frac{4n}{2n^2 + 3}$

(B) $\displaystyle\sum_{n=1}^{\infty} \left(\frac{4}{5}\right)^n$

(C) $\displaystyle\sum_{n=15}^{\infty} \left(\frac{2}{3}\right)^n$

converge(s)?

1. B only

2. A, B, and C

3. B and C only

4. C only

5. A and B only

004　10.0 points

Determine whether the series

$$\sum_{k=1}^{\infty} \frac{2}{4 + 3^k}$$

converges or diverges.

1. series is divergent

2. series is convergent

005　10.0 points

Determine whether the series

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

converges or diverges.

1. series is divergent

2. series is convergent

006　10.0 points

If a_k, b_k, and c_k satisfy the inequalities

$$0 < a_k \leq c_k \leq b_k,$$

for all k, what can we say about the series

$$(A): \sum_{k=1}^{\infty} a_k, \qquad (B): \sum_{k=1}^{\infty} b_k$$

if we know that the series

$$(C): \sum_{k=1}^{\infty} c_k$$

is divergent but know nothing else about a_k and b_k?

1. (A) diverges, (B) converges

2. (A) diverges, (B) diverges

3. (A) need not diverge, (B) diverges

4. (A) converges, (B) need not converge

5. (A) diverges, (B) need not diverge

6. (A) converges, (B) diverges

007　10.0 points

Determine whether the series

$$\sum_{k=1}^{\infty} \frac{2 + k + k^2}{\sqrt{4 + k^2 + k^6}}$$

converges or diverges.

1. series is divergent

2. series is convergent

008　10.0 points

Determine whether the series

$$\sum_{n=1}^{\infty} \frac{\cos^2(n)}{n^2 + 2}$$

converges or diverges.

1. series is divergent

2. series is convergent