Printed Name _____ Signature _____

Calculus II Quiz #5

Show your work and clearly label your answers on this quiz. *No scrap paper, calculators, or notes are allowed* (or needed). This quiz is scored out of 100 points. (There are 120 points possible.) You have 60 minutes to complete the quiz.

To get credit on a problem, you *must* show work. Even if you can do the work in your head, the point of these exercises is to get you to articulate your thought processes.

(5+3+2 pts each) For each sequence,

(a) list the first 5 terms;

(b) say if the sequence converges (and to what limit) or diverges (and how);

(c) say if the sequence is: bounded/unbounded, strictly/monotonic increasing/decreasing.

Problem 1 $a_n = \cos(\frac{n\pi}{3})$, $n \geq 0$

Problem 2 $b_n = \frac{4n^2}{n^2+5}$, $n \geq 1$

Problem 3 $c_1 = 0.1$, $c_2 = 3$, $c_{n+2} = c_n c_{n+1}$, $n \geq 1$

Problem 4 $d_1 = 1$, $d_2 = 4$, $d_{n+2} = d_n d_{n+1}$, $n \geq 1$

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(5+3+2 pts each) For each series,

(a) list the first 5 terms in the sequence of partial sums;

(b) say if the series converges (and to what limit) or diverges (and how);

(c) say if the series is: bounded/unbounded, strictly/monotonic increasing/decreasing.

Problem 5 $\sum_{n=0}^{\infty} \left(-\frac{2}{5}\right)^n$

Problem 6 $\sum_{n=1}^{\infty} \frac{3}{n}$

Problem 7 $\sum_{n=1}^{\infty} \frac{3}{2^n}$

Problem 8 $\sum_{n=1}^{\infty} \ln\left(\frac{n}{n+2}\right)$

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(5+5 pts each) For each decimal,

(a) rewrite the decimal as a geometric series;

(b) rewrite the decimal as a ratio of whole numbers (in lowest terms).

Problem 9 $0.\overline{45}$

Problem 10 $0.3\overline{2}$

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(4+4+2 pts each)

(a) Use the integral test to determine if the series converges or diverges.

(b) Use the comparison test to determine if the series converges or diverges.

(c) Give the limit, if the series converges; explain the divergence if the series diverges.

Problem 11 $\sum_{n=1}^{\infty} \frac{5}{n^2}$

Problem 12 $\sum_{n=2}^{\infty} \frac{6n^2-5}{6n^3-15n+2}$