Math 141

Exam 2 A

October 23, 2015

name_____

- NO CALCULATORS
- Show all relevant work for full credit.
- No smartphones ANYWHERE in sight!
- #1 - #8: 12 points each. #9: 4 points

1. Find the indefinite integral: $\displaystyle\int \frac{1}{x\sqrt{x^2+4}}\,dx$

2. Find the partial fraction decomposition: $\dfrac{x^2-x-1}{x^2(x-1)}$

3. Find the limit, if it exists. $\lim_{x \to 0^+} \frac{\ln(2x+1)}{e^x - 1}$

4. Determine if the improper integral converges or diverges. If convergent, find its value.

$$\int_1^\infty \frac{1}{x^2+1}\,dx$$

5. For the sequence, find the nth term, a_n. Start with the given value of *n*.

$$\left\{\frac{1}{1}, -\frac{2}{1}, \frac{5}{2}, -\frac{10}{6}, \frac{17}{24}, -\frac{26}{120}\ldots\right\}, \quad n=0$$

$$a_n =$$

6. Determine the convergence or divergence of the ***sequence*** with given n^{th} term.

a. $a_n = \dfrac{2n}{n^2+1}$

b. $a_n = \dfrac{2^{n+1}}{2^n+1}$

7. Determine the convergence or divergence of the ***SERIES***:

Name the test used.

Support your conclusion.

Find the sum, whenever possible.

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

b. $\sum_{n=0}^{\infty} (-1)^n \frac{2}{5^n}$

8. Use the series, $\sum_{n=1}^{\infty} \left(\frac{1}{n+1} - \frac{1}{n+2} \right)$, to find the following.

The type of series: _____

$S_4 =$

$S_n =$

S, if convergent.

9. (4 points) Please choose, circle one:

vs.