Name: _____ **Class:** _____ **Date:** _____

2414 Practice Test 2-Fall18

Multiple Choice
Identify the choice that best completes the statement or answers the question. Select one choice only. No partial credit.

____ 1. Find all positive values of u for which the series $\sum_{m=1}^{\infty} 6u^{\ln 7m}$ converges.

a. $u > 7$

b. $6 < u < \frac{7}{e}$

c. $0 < u < \frac{1}{e}$

d. $u < 6$

e. $u > \ln 7$

Numeric Response

1. Use Simpson's Rule to approximate the integral with answers rounded to four decimal places.

$\int_0^{\pi/2} \sqrt{1+\sin^2 x}\ dx; \qquad n = 6$

2. Find an expression for the n^{th} term of the sequence. (Assume that the pattern continues.)

$\left\{\frac{2}{25}, \frac{4}{36}, \frac{6}{49}, \frac{8}{64}, \frac{10}{81}, \ldots\right\}$

Essay

Show all work to justfity your answer. Answers with no work or insufficient work will receive NO credit. Partial credit may be given.

1. Find the integral using an appropriate trigonometric substitution.

$\int \frac{\sqrt{25x^2 - 16}}{x}\, dx$

2. Find the integral.

$$\int \tan^3 x \sec^5 x \; dx$$

3. Find the integral.

$$\int \frac{x^2 - x + 2}{x^3 - 2x^2 + x} \, dx$$

4. Determine whether the improper integral converges or diverges, and if it converges, find its value.

$$\int_{-\infty}^{\infty} \frac{3e^x}{3 + e^{2x}} \, dx$$

5. Determine whether the given series converges or diverges. If it converges, find its sum.

$$\sum_{n=0}^{\infty} \frac{-2}{(n+7)(n+5)}$$

6. How many terms of the series $\sum_{m=2}^{\infty} \frac{12}{6m(\ln m)^2}$ would you need to add to find its sum to within 0.02?

7. Use the Comparison Test to determine whether the series is convergent or divergent.

$$\sum_{n=1}^{\infty} \frac{3 + \sin 6n}{4^n}$$

2414 Practice Test 2-Fall18
Answer Section

MULTIPLE CHOICE

1. ANS: C PTS: 1 DIF: Medium REF: 11.3.45
   KEY: 7e MSC: Bimodal NOT: Section 11.3

NUMERIC RESPONSE

1. ANS: 1.9101

   PTS: 1

2. ANS: $a_n = \dfrac{2n}{(n+4)^2}$

   PTS: 1 DIF: Medium REF: 11.1.13 KEY: 7e
   MSC: Short Answer NOT: Section 11.1

ESSAY

1. ANS:
   $\sqrt{25x^2 - 16} - 4\sec^{-1}\left(\dfrac{5}{4}x\right) + C$

   PTS: 1 DIF: Medium REF: 7.3.19 KEY: 7e
   MSC: Short Answer NOT: Section 7.3

2. ANS:
   $\dfrac{1}{7}\sec^7 x - \dfrac{1}{5}\sec^5 x + C$

   PTS: 1

3. ANS:
   $\ln\left|\dfrac{x-1}{x^2}\right| - \dfrac{2}{x-1} + C$

   PTS: 1

4. ANS:
   $\dfrac{\pi\sqrt{3}}{2}$

   PTS: 1

5. ANS:
Converges to $-\frac{11}{30}$.

PTS: 1 DIF: Medium REF: 11.2.35 KEY: 7e
MSC: Short Answer NOT: Section 11.2

6. ANS:
$m > e^{100}$

PTS: 1 DIF: Medium REF: 11.3.40 KEY: 7e
MSC: Numerical Response NOT: Section 11.3

7. ANS:
Convergent

PTS: 1 DIF: Medium REF: 11.4.10 KEY: 7e
MSC: Short Answer NOT: Section 11.4