Calc II joint effort on test 3

Names_____

SHOW ALL WORK.

Evaluate the integral. Give exact answers only. If the integral diverges state that it diverges.

1) $\int \frac{3x^2 + x + 7}{(x^2 + 3)(x - 2)}\, dx$ 1) _____

2) $\int \frac{4e^{2t} - 7e^{t}}{e^{3t} - 3e^{2t} + e^{t} - 3}\, dt$ 2) _____

3) $\int_{-\infty}^{\infty} x^3 e^{-x^4}\, dx$ 3) _____

4) $\int_{8}^{32} \frac{dt}{t\sqrt{t^2 - 64}}$ 4) _____

5) $\int_{0}^{9} \frac{x}{\sqrt{81 - x^2}} dx$ 5) _____

Evaluate the limit.

6) $\lim_{x \to \infty} x \sin \frac{2}{x}$ 6) _____

7) $\lim_{x \to \infty} \left(\sqrt{x^2 + 3x} - x \right)$ 7) _____

8) $\lim_{x \to 0^+} x^{-5/\ln x}$ 8) _____

A recursion formula and the initial term(s) of a sequence are given. Write out the first five terms of the sequence.

9) $a_1 = 1, a_2 = 4, a_{n+2} = a_{n+1} - a_n$ 9) _____

Find a formula for the nth term of the sequence.

10) -6, -4, -2, 0, 2 (every other integer starting with -6) Write the nth term so n starts at 1. 10) _____

Find the limit of the sequence if it converges; otherwise indicate divergence.

11) $a_n = \dfrac{9n - 2}{6 + 5\sqrt{n}}$ 11) _____

12) $a_n = 1 + (0.9)^n$ 12) _____

Determine if the series converges or diverges. If the series converges, find its sum. If the series diverges, state diverges.

13) $\displaystyle\sum_{n=0}^{\infty} (-1)^n \frac{9}{8^n}$ 13) _____

14) $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{7}{4^n}$ 14) _____

15) $\sum_{n=1}^{\infty} \frac{5}{(4n - 1)(4n + 3)}$ 15) _____

16) $\sum_{n=1}^{\infty} \frac{4}{n(n+3)}$ 16) _____

17) $\sum_{n=1}^{\infty} \left[\frac{7n+3}{6n+2}\right]$ 17) _____