

1. (1 pt) Find the limit of the sequence:

$$a_n = \frac{7n^2 + 8n + 5}{6n^2 + 3n + 7}$$

2. (1 pt) Determine whether the sequence is divergent or convergent. If it is convergent, evaluate its limit. If it diverges to infinity, state your answer as "INF" (without the quotation marks). If it diverges to negative infinity, state your answer as "MINF". If it diverges without being infinity or negative infinity, state your answer as "DIV".

$$\lim_{n \rightarrow \infty} \frac{-4(n!)}{(-4)^n}$$

3. (1 pt) Daniel and Carrie want to purchase a house. Suppose they invest 500 dollars per month into a mutual fund. How much will they have for a downpayment after 3 years if the per annum rate of return of the mutual fund is assumed to be 9 percent compounded monthly?

4. (1 pt) Find the common ratio and write out the first four terms of the geometric sequence $\left\{ \frac{5^{n-3}}{9} \right\}$

Common ratio is ____

$$a_1 = _, \quad a_2 = _, \quad a_3 = _, \quad a_4 = _$$

5. (1 pt) Match each sequence below to statement that BEST fits it.

STATEMENTS

Z. The sequence converges to zero;

I. The sequence diverges to infinity;

F. The sequence has a finite non-zero limit;

D. The sequence diverges.

SEQUENCES

- ___1. $\frac{n^{100}}{(1.01)^n}$
- ___2. $\arctan(n+1)$
- ___3. $\ln(\ln(\ln(n)))$
- ___4. $\sin(n)$
- ___5. $\frac{(\ln(n))^n}{n}$
- ___6. $\frac{n^3 - 5n}{3n - n^5}$
- ___7. $\frac{n!}{n^{1000}}$
- ___8. $n \sin\left(\frac{1}{n}\right)$

6. (1 pt) Find the limit of the sequence whose terms are given by

$$a_n = (e^{2n} + 6n)^{1/n}.$$

7. (1 pt) Let $f(x) = \frac{x}{x^2 + 1x + 11}$.

A. Find the smallest real number r such that $f(x)$ is decreasing for all x greater than r .

$$r = \underline{\hspace{2cm}}$$

B. Find the smallest integer s such that $f(n)$ is decreasing for all integers n greater than or equal to s .

$$s = \underline{\hspace{2cm}}$$