

Name _____

Group Members:

1. Determine the limit of the sequence

(a) $f(n) = \frac{(-1)^{n+1}}{3n-1}$

(b) $a_n = (-2)^n$

(c) $g(n) = \frac{3-2n^2}{3n^3-n+2}$

2. Find a formula for the general term a_n of each sequence, assuming that the pattern of the first few terms continues. Determine whether the sequence is geometric or arithmetic, and if it is, write it in the standard form.

(a) $\{2, 5, 8, 11, 14, \dots\}$

(b) $\{1, -\frac{1}{3}, \frac{1}{9}, -\frac{1}{27}, \frac{1}{81}, \dots\}$

(c) $\{-1, \sqrt{2}, -2, \dots\}$

(d) $\{54, 18, 6, \dots\}$

(e) $\{-3, 2, 7, \dots\}$

(f) $\{\frac{16}{27}, \frac{8}{9}, \frac{4}{3}, 2, \dots\}$

3. (a) Calculate the missing terms in the arithmetic sequence with $a_1 = 6$ and $a_5 = 66$.
(b) Find a_1 of the arithmetic sequence with $a_5 = 18$ and $a_9 = 30$.
(c) Fill in the blank: 92 is the _____th term of the sequence $\{-4, 4, 12, \dots\}$
4. A culture of bacteria doubles every 2 hours. If there are 500 bacteria to start, how many will there be after 24 hours?
5. A mine worker finds an ore sample containing 500 mg of radioactive material. If the material has a half life of 1 day, what will be the amount of remaining material in the sample at the beginning of the seventh day?
6. The sum of the interior angles of a triangle is 180° , the sum of the interior angles of a square is 360° , and of a pentagon is 540° . What is the sum of interior angles of a dodecagon (12 sides)?
7. The sum of the first and third terms of a geometric sequence is 20. The sum of the first 3 terms is 26. What is the n th term of the sequence?
8. The sum of the first 2 terms of a geometric sequence is 36 and the product of the first and third is 9 times the second. What is the n th term of the sequence?

9. Suppose you have a bank account with \$150 in it, and every year it earns 4% in interest. If you never take any money out or add any money, how much money will be in the bank account after 4 years?

Challenge problem: Consider the sequence $\{1, 3, 4, 7, 11, 18, \dots\}$, where each term is found by adding the previous two terms. How many multiples of five are there in the first 100 terms of this sequence?