

Instructions: Show all work. Use exact answers unless otherwise directed to round.

1. Consider the sequences defined by $P_N = 4P_{N-1}$.
- a. Write the first five terms of the sequence if $P_0 = 10$.

10, 40, 160, 640, 2560, 10,240...

- b. Write an explicit formula for the geometric series.

$$A_N = 10(4)^N$$

- c. Find the sum of P_0 through P_{20} .

$$10 \left(\frac{1-4^{21}}{1-4} \right) = 1.466 \times 10^{13}$$

2. Find F_7 and F_8 .

- a. What is the ratio of F_8/F_7 ?

$$F_7 = 13, F_8 = 21$$

1.61538...

- b. What special number is this close to? What is its name and symbol?

the golden ratio, φ

Some useful formulas:

$$S_N = \frac{P_0(1-R^N)}{1-R}$$

$$F_N = \left\lceil \left[\left(\frac{(1+\sqrt{5})}{2} \right)^N / \sqrt{5} \right] \right\rceil$$