Limits, Sequences, and a Little Review

1. Given each table below, estimate $\lim_{n\to\infty} a_n$.

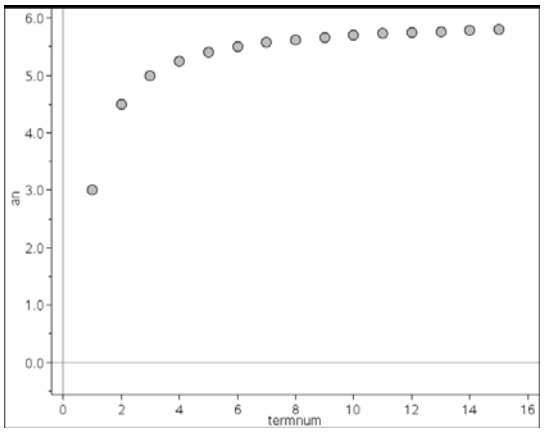
n	1	10	100	1000	10000	100000
a_n	3	2.1	2.01	2.001	2.0001	2.00001

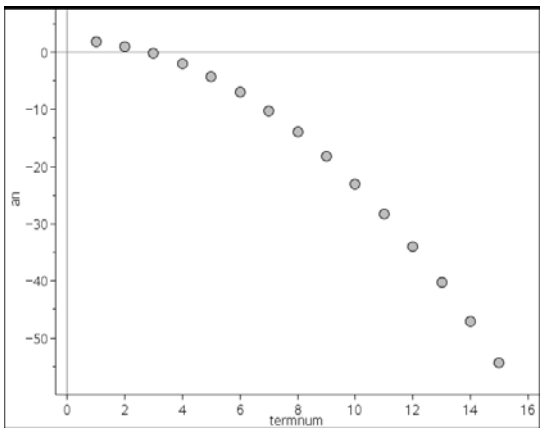
n	1	10	100	1000	10000
a_n	40	4000	400000	40000000000	40000000000000

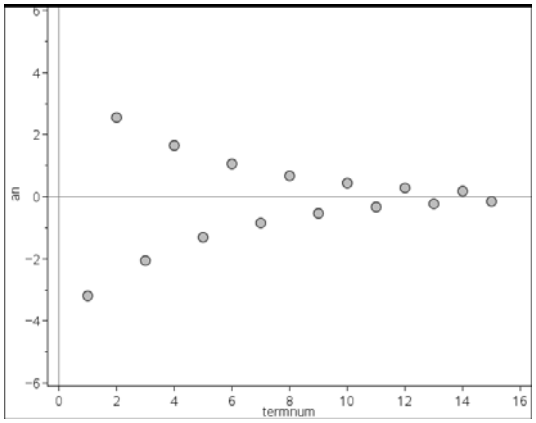
n	1	10	100	1000	10000	100000
a_n	4.9	5.1	4.99	5.01	4.999	5.001

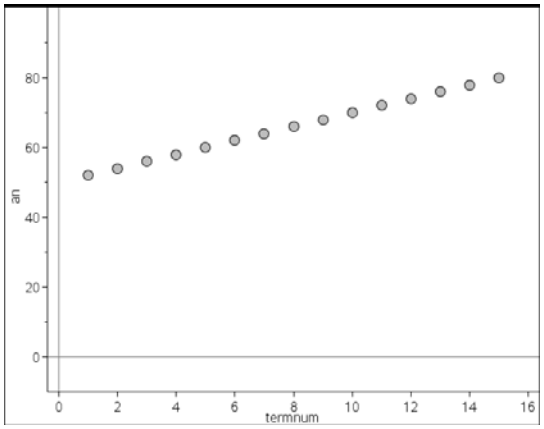
n	1	10	100	1000	10000	100000
a_n	4	6	8	10	12	14

2. Given each graph below, estimate $\lim_{n\to\infty} a_n$









3. Use long division (or the **expand** function on your calculator) to find each quotient. Or…just find the pattern.

a. $\dfrac{x^3-1}{x-1}$ b. $\dfrac{x^4-1}{x-1}$ c. $\dfrac{x^5-1}{x-1}$ d. $\dfrac{x^{10}-1}{x-1}$ e. $\dfrac{x^{20}-1}{x-1}$

4. Find the range of each function by first graphing, then checking the algebra.

a. $f(x) = x^2 + 3$ b. $g(x) = (x^2 + 3)^2 + 11$ c. $j(x) = \dfrac{18}{x^2+3}$ d. $h(x) = x^4 - 4x^2 + 17$