Precalculus Unit 8 Homework—Sigma Notation and Series

1. Evaluate:

a. $\sum_{n=1}^{5}(3n) = 45$ b. $\sum_{n=1}^{80}(2-n) = -3080$ c. $\sum_{n=3}^{24}(1-2n) = -572$ d. $\sum_{n=1}^{5}(7) = 35$

2. Find the sum of the series $38+34+30+\ldots+2$ 200

3. Find the sum of the first 60 terms of the series $2+5+8+11+\ldots$ 5430

4. A large amphitheater has 85 rows of seats with 20 seats in the first row, 24 seats in the second row, 28 in the 3rd row, and so on.
   a. How many seats are in row #72? 304 seats
   b. How many seats are in the theater? 15,980 seats
   c. How many seats are there in rows 32 through 64? 6864 seats

5. A grocery clerk sets up a display of 12-pack cartons of cola. There are 15 cartons at the base of the triangle and one at the top. How many cartons of cola are needed for the complete display? 120 cartons

6. Evaluate each geometric series described:
   a. $-2+4-8+16-\ldots$ for $n=8$ 170
   b. $-1-2-4-8-\ldots$ for $n=6$ -63

7. Evaluate: $256-64+16-4+\ldots$

8. Evaluate: $\sum_{i=1}^{8}(-6)^{i-1} = -239945$

9. Determine if each geometric series converges. If the series converges, find its sum.

a. $2+\frac{4}{3}+\frac{8}{9}+\ldots = 6$ converges

b. $8+4+2+\ldots = 16$ converges

c. $2-\frac{1}{2}+\frac{1}{8}-\frac{1}{32}+\ldots = 1.6$ converges

d. $5+10+20+\ldots$ diverges

e. $6+2+\frac{2}{3}+\ldots = 9$ converges

f. $\frac{4}{9}+\frac{4}{3}+4+12+\ldots$ diverges

10. In an old fable, a commoner who had just saved the king's life was told he could ask the king for any just reward. Being a shrewd man, the commoner said, "A simple wish, sire. Place one grain of wheat on the first square of a chessboard, two grains on the second square, four grains on the third square, continuing until you have filled each board. That is all I seek." Compute the total number of grains needed to do this to see why the request, seemingly simple, could not be granted. Hint: A chessboard consists of 64 squares. 1.845×10^{19} grains

11. You are interviewing for a job and receive two offers:
    Offer #1: \$20,000 to start with guaranteed annual increases of 6% for the first 5 years
    Offer #2: \$22,000 to start with guaranteed annual increases of 3% for the first 5 years

    A. Which offer is best if your goal is to be making as much as possible after 5 years? A
    B. Which offer is best is your goal is to make as much money as possible over the contract length of 5 years?

year 5 A: \$25,250 B: \$24,761
total A: \$112,742 B: \$116,801