

## Review for Fall Semester Final

For each of the following items, provide a complete solution on a separate sheet of paper that not only contains a correct answer, but that also shows supporting work and reasoning with correct notation.

- A) Determine the next three terms in each sequence and specify which type of sequence the pattern represents. Then describe each sequence with a recursive formula.

1) 2, 5, 14, 41, 122, ...

2) 6, 17, 23, 40, 63, ...

- B) A section of public land contains 5000 acres of trees. A logging company is allowed to clear-cut and remove 25% of the remaining forested acreage each year, as long as it also replants 400 acres of trees each year.

3) Write a recursive formula for the amount of forested acreage in this section of land after  $n$  years.

4) Draw a graph representing the amount of forested acreage during the first 6 years.

5) What happens to the amount of forested acreage in the long run? Support your conclusion.

(By the way, count the newly planted acres as “forested,” even though in reality the trees would need to grow for several years before the land could technically be considered forested.)

- C) You invest \$1500 in a savings account earning 0.75% APR compounded monthly. Each month thereafter, you deposit an additional \$50.

(Be sure to show recursive formulas, verbal models, and correct notation, as appropriate.)

6) What is your balance after 18 months?

7) Of the balance after 18 months, how much is accrued interest?

- D) You borrow \$235,000 at 6.5% APR to buy a home.

(Be sure to show recursive formulas, verbal models, and correct notation, as appropriate.)

8) To the nearest penny, what monthly payments are required to repay the mortgage in 30 years?

9) How much do you pay total for the mortgage?

10) If you pay \$75 more per month, how much money do you save?

- E) Consider the sequence 256, -192, 144, -108, 81, ...

11) Write a recursive formula for the sequence.

12) Write an explicit formula for the sequence.

13) Determine the 7th partial sum of the sequence.

14) Determine the infinite sum of the sequence, if possible.

- F) If the series is already written in summation notation, find the indicated sum, if possible. If the series is not written in summation notation, first write the series using summation notation. Then find the sum, if possible. Show formulas, as appropriate.

15) 
$$\sum_{j=1}^{21} \frac{3j+7}{5}$$

16) 
$$\frac{7}{1} + \frac{12}{1} + \frac{17}{2} + \frac{22}{6} + \frac{27}{24} + \frac{32}{120} + \frac{37}{720} + \dots$$

17) 
$$\sum_{n=0}^{\infty} 4\left(\frac{7}{2}\right)^n$$

18) 
$$5 - \frac{6}{4} + \frac{7}{9} - \frac{8}{16} + \frac{9}{25} - \frac{10}{36} + \dots - \frac{16}{144}$$

G) The New Mexico Society of Birdwatchers recently polled its members about documented sightings of various species of birds during the past year. The Society mailed a form to every member. For each species, members indicated a documented sighting in the past year by checking a box for “Yes” on the form. The results were collected from members who responded to the mailing by sending the completed form back to the Society.

19) What type of sampling was used by the Society for collecting the data?  
(cluster sampling, convenience sampling, simple random sampling, stratified sampling, systematic sampling)

H) At the annual meeting for the New Mexico Society of Birdwatchers, every attendee was asked to specify the number of different species he or she had documented in the past year.

20) To get a quick idea of the average response, meeting organizers divided the responses into four separate geographic regions (based on the address of the respondent) and then sampled 5 responses from each region. What type of sampling does this represent?  
(cluster sampling, convenience sampling, simple random sampling, stratified sampling, systematic sampling)

21) For the scenario described in the previous item, determine the population, the sample, and the variable.

I) You decide to keep track of your snowboarding/skiing adventures. Below is a sample of the information you record for every trip. Specify the highest level of measurement associated with each item.

22) Ski Area:	Wolf Creek
23) Snow Depth:	97”
24) Snow Conditions:	Excellent
25) High Temperature:	28° F
26) Number of Runs Taken (number of times down the mountain)	17