## UNIT 8 - Sequences and Series - Due Wednesday, May 15 ${ }^{\text {th }}$

Determine whether each of the following sequences is arithmetic, geometric, or neither.
1.) $-1,1,3,5,7, \ldots$
2.) $4,8,16,32,64, \ldots$
3.) $1,1,2,3,5,8, \ldots$
4.) $\frac{2}{3}, \frac{1}{2}, \frac{1}{3}, \frac{1}{6}, 0, \cdots$
5.) $a_{1}=3, a_{n}=2\left(a_{n-1}\right)-5$
6.) $a_{n}=\frac{2-n}{2}$

Write the first 5 terms of each sequence defined below:
7.) $a_{1}=1, a_{n}=4\left(a_{n-1}\right)$
8.) $a_{n}=n(n-1)$
9.) $a_{n}=(\mathrm{n}+1)^{2}$
$\qquad$
Write the next term of the sequence, and then write the rule (explicit formula) for the nth term.
10.) $5,10,15,20, \ldots$
11.) $3,7,11,15, \ldots$
12.) $9,12,15,18, \ldots$
$\qquad$
$\qquad$
13.) $5,4,3,2, \ldots$
14.) $3,9,27,81, \ldots$
15.) $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \cdots$

## Solve:

19.) Find the number of line segments in the next two iterations. $\qquad$

20.) Jim charges $\$ 50$ per week for lawn mowing and weeding services. He plans to increase his prices by $4 \%$ each year.
a.) Graph the sequence.
b.) Describe the pattern.
c.) To the nearest dollar, how much will he charge per week in 5 years?

29.) Find the $20^{\text {th }}$ term of the arithmetic sequence in which $\mathrm{a}_{3}=6$ and $\mathrm{a}_{10}=62$.
30.) Find the $8^{\text {th }}$ term of the geometric sequence in which $\mathrm{a}_{8}=156,250$ and $\mathrm{a}_{12}=97,656,250$

Find the sum of the first $\boldsymbol{n}$ terms of the series WITHOUT writing all terms.
31.) $5+8+11+14+\ldots ; n=100$
32.) $3+1+\frac{1}{3}+\frac{1}{9}+\frac{1}{27}+\ldots ; n=\infty$

## Evaluate each sum

33.) $\sum_{i=1}^{8} 2 i+3$
34.) $\sum_{i=3}^{8} 2 i+3$
35.) $\sum_{i=1}^{50} \frac{i+2}{50}$

## Simplify

36.) $\frac{(n+2)!(n-3)!}{n!(n-5)!}$

## UNIT 9 - Probability - Due Wednesday, May 15 ${ }^{\text {th }}$

## Choose the best answer.

1.) The graph below shows the number of boys and the number of girls on a school's debate team.


If a student is chosen at random from the team, what is the probability that the student is a boy?
A 0.4
B 0.6
2. A printer has 8 colors of ink, but can only pick 3 to use on a pamphlet that he is printing. How many different color combinations can he choose?
A 24
B 120
C 56
D 336
3.) Which is the probability that a 1-6 number cube lands on a number less than 2?
A 0.67
C 0.33
B 0.50
D 0.17
4.) Of the 200 seniors graduating, 45 took an art class while in high school and 89 were in the band. Only 20 of the students who took an art class were not also in band. What is the probability that a graduate chosen at random was in the band or had taken an art class?
A 0.55
B 0.67
5.) A store is keeping track of the customers who enter a certain department and whether or not they make a purchase. The results are shown below.

| Customers by Gender |  |  |
| :--- | :---: | :---: |
|  | Men | Women |
| Bought | 7 | 4 |
| Didn't Buy | 5 | 9 |

What is the probability that a customer from this group made a purchase?
A 0.44
B 0.56
6.) Use the two-way table from Question 5. What is the probability that a man did not make a purchase?
A 0.36
B 0.2
C 0.28
D 0.16
7.) Which is the probability that a card drawn from a standard deck is red and an 8 ?
A 0.25
B 0.08
C 0.16
D 0.04
8.) A gardener has counted the number of roses he has of each color. The results are graphed below.


If a rose is picked at random, what is the probability that the rose is pink?
A 0.292
B 0.375
C 0.333
D 0.471
9.) The graph below shows the number of students who have traveled to Canada and the number who haven't.


What is the probability that a student chosen at random has been to Canada?
10.) A movie theater has posters for 7 new movies. How many ways can the theater arrange 5 of the posters on a wall?
11.) A child has 4 wooden blocks. How many different ways can she stack 3 of them into a tower?
12.) What is the probability a 1-6 number cube lands on a composite number?
13.) Dan has 200 baseball cards. 61 of them are of retired players and 50 of them are of pitchers. Dan has 35 cards of retired pitchers. What is the probability that the player on one of his cards is retired or a pitcher.
14.) A television station wants to know how its newest show is performing. The results of their poll of high school students is shown below.

| Viewership by Grade |  |  |
| :---: | :---: | :---: |
|  | $\mathbf{9 - 1 0}$ | $\mathbf{1 1 - 1 2}$ |
| Watch | 8 | 9 |
| Don't Watch | 7 | 16 |

What is the probability that a student in
9th or 10th grade watches the show?
15.) Use the two-way table from Question 12. What is the probability that a student is in $11^{\text {th }}$ or $12^{\text {th }}$ grade?
16.) What is the approximate probability that a card drawn from a standard deck is red and has a letter on it?
17.) Which is the probability two 1-6 number cubes land on an even number?
A 0.75
B 0.25
C 0.50
D 0.10
18.) A menu at a restaurant offers 9 different appetizers. How many different ways can a group order 4 appetizers?
A 81
B 3024
C 126
D 5040

