Alg 2 Honors

Garcia

Weeks 5, 6, & 7
Apr 27 – May 15

Algebra 2 Honors week 5, 6, & 7

Thursday 4/23
- Watch Video 9.6
- Complete power point notes using the video
- Assignment – WS 9.6 #1-26
    - DO ON A SEPARATE PIECE OF PAPER

Friday 4/24
- Zoom meeting at 11am to answer questions

Tuesday 4/28
- Assignment WS 9.6 #1-26 DUE BY 10am
- Assignment – Review Worksheet Ch 9
    - DO ON A SEPARATE PIECE OF PAPER

Thursday 4/30
- Zoom meeting at 11:00am to answer questions

THURSAY 4/30 OR FRIDAY 5/1
- Test Ch 9 – more info to follow

Monday 5/4
- Watch video 11.2 and 11.4
- Complete power point notes using video
- Assignment – Worksheet 11.2 and 11.4
    - DO ON A SEPARATE PIECE OF PAPER

Tuesday 5/5
- Zoom meeting at 11am to answer questions

Wednesday 5/6
- Assignment page WS 112. & 11.4 is DUE BY 10am
- Watch video 11.3 & 11.5
- Assignment – WS 11.3 & 11.5
    - DO ON A SEPARATE PIECE OF PAPER

Thursday 5/7
- Zoom meeting at 11am to answer questions

Friday 5/8
- Assignment WS 11.3 & 11.5 DUE BY 10am
- Assignment –Review Worksheet Ch 11
    - DO ON A SEPARATE PIECE OF PAPER

Monday 5/11
- Zoom meeting at 11am to answer questions

Tuesday 5/12
- QUIZ CH 11 – more info to follow

Wednesday 5/13
- Watch video 6.8
- Assignment – WS 6.8
    - DO ON A SEPARATE PIECE OF PAPER

Thursday 5/14
- Zoom meeting at 11am to answer questions

Friday 5/15
- Assignment WS 6.8 DUE BY 10am

- Assignment –Review Worksheet Ch 11
  - DO ON A SEPARATE PIECE OF PAPER

REMEMBER – YOU CAN EMAIL OR TEXT ME ANY TIME IF YOU HAVE QUESTIONS. MAKE SURE THAT YOUR NAME IS ON **EVERY** PAGE. IF YOU WOULD LIKE ME TO GO LIVE MORE THAN JUST ONCE PER SECTION, WE CAN DISCUSS. I WILL SEND YOU THE ANSWERS TO SOME OF THE PROBLEMS. I AM GOING TO GRADE YOUR ASSIGNMENTS BY SELECTING 1-3 PROBLEMS FROM THE ASSIGNMENT AND **GRADING IT FOR ACCURACY**. YOU WILL TURN YOUR WORK IN BY REMIND, EMAIL OR UPLOADING TO FOCUS. PLEASE BE CONSCIOUS OF THE DEADLINES. ALL ASSIGNMENTS, VIDEOS, & POWERPOINTS ARE ON THE WEBPAGE CALENDAR

11.3 & 11.5 Geometric Sequences & series

Geometric Sequence

- The ratio between consecutive terms is constant. Called the common ratio (r).

$$\exp licit: \quad a_n = a_1 \bullet r^{n-1}$$

(to find the value of the nth term when the previous term is unknown)

$a_n = nth$ term

$a_1 = 1st$ term

$n = $ term number

$r = $ common ratio

Ex 1

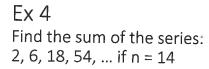Is this geometric? If so, find r.

- 1, -6, 36, -216, ...

Ex 2

- Find the 19th term: 11, 33, 99, 297, ...

Ex 3

- Find the first term of a geometric sequence if the 11th term is 84 and r = ½

Sum of terms of a finite geometric series

$$S_n = \frac{a_1(1 - r^n)}{1 - r}$$

Ex 4

Find the sum of the series:

2, 6, 18, 54, ... if n = 14

Ex 5

Find S_{20} if $a_1 = 100$ and $a_2 = 96$

Ex 6 - BONUS

- 34,816 is a term in a geometric sequence. If a_1 = 17 and r = 2, which term is it?

11.2 & 11.4 Arithmetic Sequences & Series

Arithmetic sequence – the difference (d) between consecutive terms is constant

•Explicit: $a_n = a_1 + (n-1)d$

(used to find a specified term of a sequence)
- a_n = nth term
- a_1 = 1st term
- n = term #
- d = common difference

Ex 1
is this arithmetic? If so, find d.

•7, 10, 13, 16, ...

•2, 5, 9, 14, ...

Ex 2
•5, 11, 17, 23, ... Use the explicit formula to find the 25th term

Ex 3

•68 is a term in an arithmetic sequence. If a_1 = 5, d = 3. Which term is it?

Series – the sum of the terms of a sequence

• Finite – has an end
• Infinite – has ellipsis (…)keeps going

Arithmetic series – terms form an arithmetic sequence

Sigma Notation

$$\sum_{n=1}^{3} 5n + 1$$

1 is lower limit (least value)

3 is upper limit (greatest value)

5n + 1 is explicit formula

Ex 4
- Write in sigma notation & evaluate.

3 + 8 + 13 + 18 + ... n = 9

Sum of a finite series - arithmetic

$$s_n = \frac{n}{2}(a_1 + a_n) \quad \text{(use if know the last term)}$$

or

$$S_n = \frac{n}{2}(2a_1 + (n-1)d) \quad \text{(use if know d and not}$$

last term or to find n)

Ex 5
• Find S_{127} for 17 + 21 + 25 + ...

Ex 6 - bonus

- If $S_n = 26{,}361$ in $2 + 9 + 16 + \dots$, find n if $d = 7$

Is the sequence arithmetic? If so, identify the common difference.
   1. 2, 3, 5, 8, …   2. 3, 18, 13, 18, …

Find the specified terms of the indicated arithmetic sequence.
   3. 45$^{\text{th}}$ term of 2, 5, 8, …   4. 29$^{\text{th}}$ term of 7, 11, 15, …

   5. 51$^{\text{st}}$ term of 18, 14, 10, …   6. 68$^{\text{th}}$ term of 95, 92, 89, …

   7. Seventeenth term of $3\sqrt{2}, 7\sqrt{2}, 11\sqrt{2}, \ldots$ 8. a_{64}, a_{65}, a_{66} for 8, 11, 14, …

   9. a_{95}, a_{96}, a_{97} for 136, 131, 126, …

For each series, find the number of terms, the first term, the last term and then evaluate.

   10. $\displaystyle\sum_{n=1}^{4} n - 1$ 11. $\displaystyle\sum_{n=2}^{6} 2n - 1$ 12. $\displaystyle\sum_{n=3}^{6} 3n + 2$

Use summation (sigma) notation to write each arithmetic series for the specified number of terms then evaluate.
   13. $1 + 3 + 5 + \ldots; n = 7$ 14. $10 + 7 + 4 + \ldots; n = 6$

   15. $4 + 8 + 12 + \ldots; n = 4$ 16. $15 + 25 + 35 + \ldots; n = 7$

Evaluate each series to the given term.
   17. $3 + 4 + 5 + \ldots; 47^{\text{th}}$ term   18. $-10 - 8 - 6 - \ldots; 14^{\text{th}}$ term

   19. $6 + 10 + 14 + \ldots; 11^{\text{th}}$ term   20. $-18 - 16 - 14 - \ldots; 20^{\text{th}}$ term

Find the specified terms of the indicated geometric sequence.

1. Seventh term of 2, 6, 18, ...

2. Ninth term of 1, 2, 4, ...

3. Tenth term of 12, 6, 3, ...

4. Eight term of 54, 18, 6, ...

5. Tenth term of 1, -2, 4, ...

6. 51st term of the sequence for which $a_1 = 7$ and $r = 1.02$

7. 43rd term of the sequence for which $a_1 = 100$ and $r = 1.04$

8. 37th term of the sequence for which $a_1 = 29$ and $r = 0.92$

9. 31st term of the sequence for which $a_1 = 1000$ and $r = 0.95$

Determine if the series is arithmetic or geometric and then evaluate to the given term.

10. $2 + 5 + 8 + 11 + ...; S_9$

11. $-3 + 6 - 12 + 24 - ...; S_{10}$

12. $-2 + 2 + 6 + 10 + ...; S_{12}$

13. $\dfrac{1}{8} + \dfrac{1}{16} + \dfrac{1}{32} + \dfrac{1}{64} + ...; S_8$

14. $40 + 20 + 10 + ...; S_{10}$

15. $4 + 12 + 36 + ...; S_{15}$

16. $27 + 9 + 3 + ...; S_{100}$

Find out which term the given number is in the indicated sequence.

17. 1 in the geometric sequence with $a_1 = 729$ and $r = 1/3$

18. 27 in a geometric sequence with $a_1 = 1728$ and $r = \frac{1}{2}$

19. -1215 in a geometric sequence with $a_1 = 5$ and $r = -3$

20. $S_n = 24{,}300$, $a_1 = 13$ and $d = 2$

21. $S_n = 18{,}423$, $a_1 = -13$ and $d = 5$

Write using sigma notation and then evaluate the series.

1. S_{20} for $2 + 6 + 10 + 14 + 18 + \ldots$

2. S_{10} for $\dfrac{1}{9} - \dfrac{1}{3} + 1 - 3 + \ldots$

Find S_n for the indicated arithmetic series.

3. S_{10} for $4 + 7 + 10 + \ldots$

4. S_{20} for the series with $a_1 = 15$ and $d = 10$

Find S_n for the indicated geometric series.

5. S_5 for $1 + 2 + 4 + \ldots$

6. S_5 for $3 - 6 + 12 - \ldots$

A partial sum of the series is given. Find the number of terms in the partial sum.

7. A.S. $S_n = 3219$, $a_1 = 15$, $d = 4$

8. A.S. $S_n = 4859$, $a_1 = 8$, $d = 5$

9. G.S. $S_n = 6817.748$, $a_1 = 47$, $r = 1.06$

10. G.S. $S_n = 1856.42$, $a_1 = 200$, $a_3 = 162$

Is the sequence arithmetic or geometric? Find r or d.

11. $18, -9, \dfrac{9}{2}, \ldots$

12. $8 + 9 + 11 + 14 + \ldots$

Find the specified term.

13. $-4, -1, 2, \ldots; a_{28}$

14. $2, 8, 32, 128, \ldots; a_{13}$

Evaluate.

15. $\displaystyle\sum_{n=1}^{6} 2n - 3$

16. $\displaystyle\sum_{n=3}^{5} n^2 + n - 1$

17. $24{,}576$ is a term in a geometric sequence. The first term is 3 and $r = 2$. Find n.

Notes 6.8 Binomial Theorem

$(a + b)^0 = 1$

$(a + b)^1 = a + b$

$(a + b)^2 = a^2 + 2ab + b^2$

$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

Pascal's Triangle

- Coefficients for the expansion of $(a + b)^n$

```
                1
            1       1
         1      2      1
      1     3      3      1
   1     4      6      4      1
```

- Exponents of 'a' begin at n and decrease
- Exponents of 'b' begin at 0 and increase
- There are n+1 terms
- Exponents of 'a' and 'b' = n

EX 1

- Expand: $(a + b)^5$

EX 2

▶ Expand: $(x - 3)^4$

Binomial Theorem

To expand $(a + b)^n =$

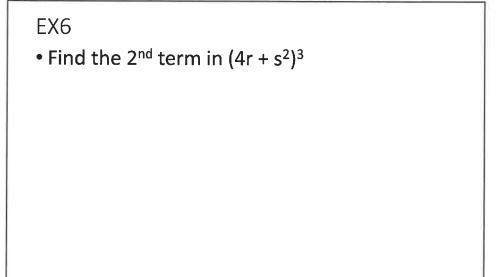$$_nC_0a^n + {_nC_1}a^{n-1}b + {_nC_2}a^{n-2}b^2 + ..._nC_{n-1}ab^{n-1} + {_nC_n}b^n$$

EX 3

- Expand: $(x - y)^9$

EX 4

• Expand: $(2x - y^2)^4$

EX 5

• Find the 8th term in $(a + b)^{12}$

EX6

- Find the 2nd term in $(4r + s^2)^3$

The Binomial Theorem

Date_____ Period_____

Find each coefficient described.

1) Coefficient of x^2 in expansion of $(2 + x)^5$

2) Coefficient of x^2 in expansion of $(x + 2)^5$

3) Coefficient of x in expansion of $(x + 3)^5$

4) Coefficient of b in expansion of $(3 + b)^4$

5) Coefficient of $x^3 y^2$ in expansion of $(x - 3y)^5$

6) Coefficient of a^2 in expansion of $(2a + 1)^5$

Find each term described.

7) 2nd term in expansion of $(y - 2x)^4$

8) 4th term in expansion of $(4y + x)^4$

9) 1st term in expansion of $(a + b)^5$

10) 2nd term in expansion of $(y - x)^4$

Expand completely.

11) $(2m - 1)^4$

12) $(x - y)^3$

13) $(x^4 - y)^5$

14) $(2x^3 + 1)^5$

15) $(y - x^2)^3$

16) $(y^3 - 4x)^3$