

Name: _____

Date: _____

Topic: _____

Class: _____

Main Ideas/Questions	Notes/Examples						
ARITHMETIC SEQUENCE	a sequence in which the pattern is being added or subtracted						
COMMON DIFFERENCE	<p>2nd # - 1st # is the common difference</p> <p>Must check for each term</p> <p>3rd # - 2nd # 4th # - 3rd #</p>						
IDENTIFYING an Arithmetic Sequence	<p>Determine whether the sequences are arithmetic. If yes, identify the common difference.</p> <table border="0"> <tr> <td>1. 1, 5, 9, 13, ... 5-1=4 9-5=4 13-9=4 yes</td> <td>2. 1, 3, 5, 8, ... 3-1=2 5-3=2 8-5=3 No</td> </tr> <tr> <td>3. 8, 6, 4, 2, ... 6-8=-2 4-6=-2 2-4=-2 yes</td> <td>4. -5, -8, -11, -14, ... -8-5=-3 -11-8=-3 -14-11=-3 yes</td> </tr> <tr> <td>5. 5, 10, 20, 40, ... 10-5=5 20-10=10 No</td> <td>6. 7, 6, 5, 4, ... 6-7=-1 5-6=-1 4-5=-1 yes</td> </tr> </table>	1. 1, 5, 9, 13, ... 5-1=4 9-5=4 13-9=4 yes	2. 1, 3, 5, 8, ... 3-1=2 5-3=2 8-5=3 No	3. 8, 6, 4, 2, ... 6-8=-2 4-6=-2 2-4=-2 yes	4. -5, -8, -11, -14, ... -8-5=-3 -11-8=-3 -14-11=-3 yes	5. 5, 10, 20, 40, ... 10-5=5 20-10=10 No	6. 7, 6, 5, 4, ... 6-7=-1 5-6=-1 4-5=-1 yes
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CONTINUING Arithmetic Sequences	<p>Given the arithmetic sequence, find the next three terms.</p> <p>7. 9, 13, 17, 21, <u>25</u>, <u>29</u>, <u>33</u> +4 +4 +4 $d = 13 - 9 = 4$ So add 4 to every term</p> <p>8. 5, 2, -1, -4, <u>-7</u>, <u>-10</u>, <u>-13</u> -3 -3 -3 $d = 2 - 5 = -3$</p> <p>9. -8, -2, 4, 10, <u>16</u>, <u>22</u>, <u>28</u> +6 +6 +6 +6 $d = -2 - -8 = 6$ Add 6 to every term</p>						
Arithmetic Sequence FORMULA recursive formula:	<p>The n^{th} term of an arithmetic sequence can be found using the following formula: $a_n = a_1 + d(n-1)$ n is the # of term looking for $d =$ common difference ; $a_1 =$ 1st # you see</p>						
<p>Must have 2 = signs $a_1 = \#$ $a_n = a_{n-1} + d$</p> <p>EXAMPLES</p>	<p>Write the rule for the n^{th} term, then find a_{19}.</p> <table border="0"> <tr> <td> <p>10. 7, 13, 19, 25, ... $d = 13 - 7 = 6$ $a_1 = 7$ $a_n = 7 + 6(n-1)$ $a_n = 7 + 6n - 6$ $a_n = 6n + 1$ $a_{19} = 6(19) + 1$ $a_{19} = 115$</p> </td> <td> <p>11. 30, 26, 22, 18, ... $d = 26 - 30 = -4$ $a_1 = 30$ $a_n = 30 + -4(n-1)$ $a_n = 30 - 4n + 4$ $a_n = -4n + 34$ $a_{19} = -4(19) + 34$ $a_{19} = -42$</p> </td> </tr> </table> <p>recursive: $a_1 = 7$ $a_n = a_{n-1} + 6$</p> <p>recursive $a_1 = 30$ $a_n = a_{n-1} - 4$</p>	<p>10. 7, 13, 19, 25, ... $d = 13 - 7 = 6$ $a_1 = 7$ $a_n = 7 + 6(n-1)$ $a_n = 7 + 6n - 6$ $a_n = 6n + 1$ $a_{19} = 6(19) + 1$ $a_{19} = 115$</p>	<p>11. 30, 26, 22, 18, ... $d = 26 - 30 = -4$ $a_1 = 30$ $a_n = 30 + -4(n-1)$ $a_n = 30 - 4n + 4$ $a_n = -4n + 34$ $a_{19} = -4(19) + 34$ $a_{19} = -42$</p>				
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recursive $a_1 = -11$ $a_n = a_{n-1} + 3$	12. -11, -8, -5, -2 ... $d = -8 - (-11) = 3$ $a_1 = -11$ $a_n = -11 + 3(n-1)$ $a_n = -11 + 3n - 3$ $a_n = 3n - 14$ $a_{19} = 3(19) - 14$ $a_{19} = 43$	13. -2, 0, 2, 4, ... $d = 0 - (-2) = 2$ $a_1 = -2$ $a_n = -2 + 2(n-1)$ $a_n = -2 + 2n - 2$ $a_n = 2n - 4$ $a_{19} = 2(19) - 4$ $a_{19} = 34$	recursive $a_1 = -2$ $a_n = a_{n-1} + 2$
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recursive $a_1 = -16$ $a_n = a_{n-1} - 5$	14. -16, -21, -26, -31, ... $d = -21 - (-16) = -5$ $a_1 = -16$ $a_n = -16 - 5(n-1)$ $a_n = -16 - 5n + 5$ $a_n = -5n - 11$ $a_{19} = -5(19) - 11$ $a_{19} = -106$	15. 101, 92, 83, 74, ... $d = 92 - 101 = -9$ $a_1 = 101$ $a_n = 101 - 9(n-1)$ $a_n = 101 - 9n + 9$ $a_n = -9n + 110$ $a_{19} = -9(19) + 110$ $a_{19} = -61$	recursive $a_1 = 101$ $a_n = a_{n-1} - 9$
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APPLICATIONS

16. You visit the Grand Canyon and drop a penny off the edge of the cliff. The distance the penny will fall is 16 feet for the first second, 48 feet the next second, 80 feet the third second, and so on.

$16, 48, 80, \dots$

a. Write a formula to represent this sequence.

$a_1 = 16$ $d = 48 - 16 = 32$

$a_n = 16 + 32(n-1)$
 $a_n = 16 + 32n - 32$
 $a_n = 32n - 16$

b. How far will the penny have traveled after 6 seconds?

$a_6 = 32(6) - 16$
 $a_6 = 176 \text{ ft}$