Name: KEY TA: _____

Math 11 Pre-Calculus LG 1 Ver B /20

1. Write the first 4 terms of the arithmetic sequence where $t_1 = -1$ and $d = 5$. *(2 marks)*

$t_1 = -1$
$t_2 = t_1 + d = -1 + 5 = 4$
$t_3 = t_2 + d = 4 + 5 = 9$
$t_4 = t_3 + d = 9 + 5 = 14$

$\boxed{-1, 4, 9, 14}$

2. If $t_n = -2n + 1$, determine t_7. *(1 mark)*

$t_n = -2n + 1$
$t_7 = -2(7) + 1$
$= -14 + 1$
$= \boxed{-13}$

3. If t_1 is 7 and t_8 is 49, determine t_3 and t_5. *(2 marks)*

$t_8 = t_1 + 7d.$
$49 = 7 + 7d.$
$-7 \quad -7$
$42 = 7d$
$d = 6$

$t_3 = t_1 + 2d$
$= 7 + 2(6)$
$= 19$
$t_5 = t_3 + 2d$
$= 19 + 2(6)$

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$\boxed{t_3 = 19 \quad t_5 = 31}$

4. Determine the first term of an arithmetic sequence if the 17th term is 36 and the difference is -4. *(2 marks)*

$t_{17} = t_1 + 16d$

$36 = t_1 + (16)(-4)$

$36 = t_1 - 64$

$+64 \quad +64$

$\boxed{t_1 = 100}$

5. Determine the sum of the arithmetic series: -11 + (-6) + (-1) + 4 + ... + 94. *(3 marks)*

$t_1 = -11$

$d = 5$

$t_n = 94$

$t_n = t_1 + (n-1)d$

$94 = -11 + (n-1)(5)$

$+11 \quad +11$

$\frac{105}{5} = \frac{(n-1)5}{5}$

$21 = n - 1$

$n = 22$ terms

$S_{22} = \frac{22}{2}(-11 + 94)$

$= 11(83)$

$= \boxed{913}$

6. Find the sum of the first 18 terms of the following series: 8 + 6 + 4 + ... *(2 marks)*

$t_1 = 8$

$d = -2$

$t_n = t_1 + (n-1)d$

$t_n = 8 + (18-1)(-2)$

$= 8 + (17)(-2)$

$= 8 - 34$

$t_n = -26$

$S_n = \frac{n}{2}(t_1 + t_n)$

$S_{18} = \frac{18}{2}(8 + -26)$

$= 9(-18)$

$\boxed{S_{18} = -162}$

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7. Carol was building a pyramid of bricks. She started with 35 bricks on the bottom row. The next row on top had 4 less bricks in it.

a) How many rows of bricks would there be if there were only 3 bricks in the top row? *(2 marks)*

$t_1 = 35$
$d = -4$
$t_n = 3$

$t_n = t_1 + (n-1)(d)$
$3 = 35 + (n-1)(-4)$
$3 = 35 - 4n + 4$
$3 = 39 - 4n$
$-36 = -4n$
$n = 9$

9 rows

b) What is the total number of bricks she would need to build the pyramid? *(1 mark)*

$S_9 = \frac{9}{2}[35 + 3]$
$= \frac{9}{2}[38]$
$= 9(19)$
$= \boxed{171}$

8. The 15th term of an arithmetic sequence is 100 and the sum of the first 15 terms is 870. Determine the first 3 terms of the series. *(2 marks)*

$t_{15} = 100$
$S_{15} = 870$

$S_n = \frac{n}{2}(t_1 + t_n)$
$S_{15} = \frac{15}{2}(870) = \frac{15}{2}(t_1 + 100)$
$\frac{1740}{15} = \frac{15}{15}(t_1 + 100)$
$116 = t_1 + 100$
$t_1 = 16$

$t_n = t_1 + (n-1)d$
$100 = 16 + (15-1)d$
$-16 \quad -16$
$\frac{84}{14} = \frac{14}{14}d$
$6 = d$

$t_1 = 16$
$t_2 = 16 + 6 = 22$
$t_3 = 22 + 6 = 28$

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9. The terms $x + 2$, $2x + 4$, and $5x - 2$ are consecutive terms in an arithmetic sequence. Determine the value of x and state the three terms. *(3 marks)*

$d = t_2 - t_1$

$d = t_3 - t_2$

$t_2 - t_1 = t_3 - t_2$

$2x+4-(x+2) = (5x-2)-(2x+4)$

$2x+4-x-2 = 5x-2-2x-4$

$x+2 = 3x-6$

$-3x \quad -2 \quad -3x \quad -2$

$-2x = -8$

$x = 4$

terms: $t_1 = x+2 = 4+2 = 6$

$t_2 = 2x+4 = 2(4)+4 = 12$

$t_3 = 5x-2 = 5(4)-2 = 18$

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