ALGEBRA 2 **NAME** Key

Chapter 10 sections 1 and 2 Review

FORMULAS:

$$t(n) = 1st\ term + change(n-1) \qquad Sum = S(n) = (1st + last)\frac{n}{2}$$

$$t(n) = 1st\ term \cdot change^{n-1} \qquad Sum = S(n) = \frac{1st\ term \cdot change^{n} - 1st\ term}{change - 1}$$

**change = common difference or common ratio (multiplier)*

Section 1. Multiple Choice

A 1) What is the 20th term in the arithmetic sequence for which $1st\ term = 5$ and change = 4 ?

A) 81 B) 85 C) 96 D) 105

$t(20) = 5 + 4(20-1)$
$t(20) = 5 + 4(19)$
$5 + 76 = 81$

C 2) The number 54 is what term in the arithmetic sequence –12, -9, -6, -3, . . . ?

A) 25th B) 24th C) 23rd D) 22nd

$54 = -12 + 3(n-1)$
$\frac{66}{3} = \frac{3(n-1)}{3}$
$22 = n-1$
$23 = n$

B 3) What are the missing terms in the arithmetic sequence 6, 14, 22, 30 ?

A) 12, 24 B) 14, 22 C) 12, 18 D) 18, 18

+8 +8 +8

Change!
$\frac{30-6}{4-1} = \frac{24}{3} = 8$

D 4) What is *Sum* for the arithmetic series in which $1st\ term = 4$, change = 3, and $last\ term = 61$?

A) 20 B) 1280 C) 64 (D) 650

$61 = 4 + 3(n-1)$
$57 = 3(n-1)$
$19 = n-1$
$20 = n$
$Sum = (4+61)(10)$

D 5) What is the 1st term of the arithmetic series in which n=6, $last\ term = 44$, and the $Sum = 174$?

A) -58 B) 58 C) -14 (D) 14

$\frac{174}{3} = \frac{(a+44)(3)}{3}$
$58 = a + 44$
$14 = a$

A 6) What is the change for the geometric sequence 4, 12, 36, 108, . . . ?

(A) 3 B) $\frac{1}{3}$ C) 8 D) $\frac{1}{8}$

D 7) What is the 6th term in the geometric sequence in which $1st\ term = 3$ and change = -2 ?

A) -7 B) 48 C) 96 (D) -96

$t(6) = 3(-2)^{6-1}$
$t(6) = 3(-2)^{5}$
$3(-32) = -96$

A 8) What is *Sum* for the geometric series in which $1st\ term = -16$, second term $= 8$, and n = 5 ?

(A) -11 B) 11 C) -44 D) -10

$-16 + 8 + \_ + \_ + \_$
$r = -\frac{1}{2}$

$S(5) = \frac{-16\left(-\frac{1}{2}\right)^{5} - (-16)}{-\frac{3}{2}}$

$S(5) = -11$

Section 2. Show your work.

Find the n^{th} term of each arithmetic sequence:

9) 1st term = 3, change = 7, n = 8

$t(8) = 3 + 7(8-1)$

$t(8) = 52$

10) 1st term = 8, change = -5, n = 12

$t(12) = 8 - 5(12-1)$

$t(12) = 8 - 55$

$t(12) = -47$

11) Find the 23rd term in the arithmetic sequence 2, 5, 8, 11, . . .

$t(n) = 2 + 3(n-1)$

$t(23) = 2 + 3(23-1)$

$t(23) = 68$

12) Find the missing terms of the arithmetic sequence -8, -3, 2, 7, 12

(1 2 3 4 5)

$\frac{12-(-8)}{5-1} = \frac{20}{4} = 5 = \text{change}$

13) Find Sum for the arithmetic sequence 1st term = 5, last term = 104, n = 34

$S(34) = (5+104)\left(\frac{34}{2}\right) = 109 \cdot 17 = 1853$

14) Find the sum: $\sum_{n=1}^{7}(2(n-1)-2)$

$t(1) = -2$

$t(7) = 10$

$(-2+10)\left(\frac{7}{2}\right)$

$8 \cdot \frac{7}{2} = 28$

15) Find the next 3 terms of the geometric sequence: 2, -8, 32, -128, 512, -2048

$\frac{-8}{2} = -4$

(-4) (-4)

16) Find the n^{th} term of the geometric sequence: 1st term = 7, change = -5, n = 6

$t(n) = 7(-5)^{n-1}$

$t(6) = 7(-5)^{6-1} = -21875$

17) Find the 12th term of the following geometric sequence: $\frac{1}{3}$, 1, 3, . . .

$t(n) = \frac{1}{3}(3)^{n-1}$

$t(12) = \frac{1}{3}(3)^{12-1} = 59{,}049$

18) Find Sum for the geometric series: 1st term = 4, change = -3, n = 5

$t(n) = 4(-3)^{n-1}$ $\quad S(5) = \frac{4(-3)^5 - 4}{-4}$

$S(5) = 244$

19) Find the sum of the geometric series: $\sum_{n=1}^{5} 5(-4)^{n-1}$

$t(1) = 5$

$t(5) = -1280$

$S(5) = \frac{5(-4)^5 - 5}{-5}$

$S(5) = 1025$

20) Find the sum, if possible, of the infinite geometric series 972+324+108+....

$r = \frac{324}{972} = \frac{1}{3}$ $\quad S = \frac{a}{1-r}$

$\frac{972}{1-\frac{1}{3}}$ $\quad \frac{972}{\frac{2}{3}}$

$S = 1458$

21) Given a bouncing ball that travels 8 meters up on the first throw and bounces 80% of the previous height after each bounce.

a. Find the total ~~height~~ distance after 12 bounces.

$t(13) = 16(0.8)^{13-1}$ $\quad S(12) = \frac{16(0.8)^{12} - 16}{0.8 - 1} = 74.5024$ meters

b. Find the total distance if the ball were to bounce an infinite number of times.

$\frac{16}{1-0.8} = \frac{16}{0.2} = \frac{160}{2} = 80$ meters