

Unit 7 Discrete Functions Review

Warm Up:

1. The first term in an arithmetic sequence is 5. The sum of the second and third term is -38. What are the first 3 terms in the sequence?

$$a = 5$$

$$d =$$

$$a, a+d, a+2d, \dots$$

$$t_2 + t_3 = -38$$

$$(a+d) + (a+2d) = -38$$

$$2a + 3d = -38$$

$$a=5 \rightarrow 2(5) + 3d = -38$$

$$10 + 3d = -38$$

$$3d = -48$$

$$d = -16$$

\therefore The first 3 terms are:

$$5, -11, -27$$

2. Write the general and recursive formulas for the sequence:

$$-2, 6, -18, \dots$$

$$t_n = ar^{n-1}$$

<u>Geometric</u> $r = -3$ $a = -2$
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$$\therefore \text{General formula is } t_n = -2(-3)^{n-1}$$

$$\text{recursively } t_n = r t_{n-1}$$

\therefore The recursive formula is

$$t_n = -3t_{n-1}, \text{ where } n > 1 \text{ and } t_1 = -2$$

$t_n = a + d(n-1)$	$t_n = ar^{n-1}$
$S_n = \frac{n[2a + d(n-1)]}{2}$	$S_n = \frac{a(r^n - 1)}{r-1}$

geometric sequence: a, ar, ar^2, \dots

(UNIT TEST will be Wed, June 8th)

True/False - Indicate whether the statement is true or false.

Term Number, n	Term, t_n
1	7
2	10
3	13
4	16

- T 1. The formula, in function notation, for the terms in the table is $f(n) = 3n + 4$.
- ___ 2. The function that describes the number of fish in a pond at a given time is a discrete function.
- ___ 3. The Fibonacci sequence can be written as the recursion formula $t_1 = 1, t_2 = 1, t_n = t_{n-2} + t_{n-1}$.
- F 4. The fifth term in the sequence defined by the recursion formula $t_1 = 2, t_n = 2t_{n-1} - 1$ is 9.
- ___ 5. Consecutive terms in a geometric sequence have a common difference.
- ___ 6. The common ratio of a geometric sequence can be found by evaluating the expression $\frac{t_n}{t_{n-1}}$.

④ $t_1 = 2, t_n = 2t_{n-1} - 1$

$t_2 = 2(2) - 1$
 $= \underline{\underline{3}}$

$t_4 = 2(5) - 1$
 $= \underline{\underline{9}}$

$t_3 = 2(3) - 1$
 $= \underline{\underline{5}}$

$t_5 = 2(9) - 1$
 $= \underline{\underline{17}}$

TRUE/FALSE

- ANS: T
- ANS: T
- ANS: T
- ANS: F
- ANS: F
- ANS: T

Multiple Choice - Identify the choice that best completes the statement or answers the question.

- ___ 7. Which of the following functions can be used to generate the terms in the sequence 3, 5, 7, 9, ...?
- a. $f(n) = 2n + 1$ c. $f(n) = 3n$
 b. $f(n) = n + 2$ d. $f(n) = 3n - 1$
- ___ 8. Which term in the sequence defined by $t_n = \frac{2n-3}{n}$ has a value of $\frac{5}{4}$?
- a. 3 c. 5
 b. 4 d. 6
- d 9. Which of the following recursion formulas produces the sequence 5, 2, -4, -16, ...?
- a. $t_1 = 5, t_n = t_{n-1} - 3$ c. $t_1 = 1, t_n = 6t_{n-1} - 1$
 b. $t_1 = 1, t_n = 5t_{n-1} - 2$ d. $t_1 = 5, t_n = 2t_{n-1} - 8$

⑨ a) $t_1 = 5$ 5, 2, -1

$t_2 = 5 - 3$
 $= 2$

$t_3 = 2 - 3$
 $= -1$

b) $t_1 = 1$ X

c) $t_1 = 1$ X

d) $t_1 = 5$
 $t_2 = 2(5) - 8$
 $= 2$

$t_3 = 2(2) - 8$
 $= -4$

5, 2, -4 ✓

MULTIPLE CHOICE

- ANS: A
- ANS: B
- ANS: D

a 10. A car is purchased for \$20 000 and will depreciate by 10% of the previous year's value each year. Which recursion formula represents the terms associated with the value of the car each year, where t_1 represents the year it was purchased?

a. $t_1 = 20\ 000, t_n = 0.9t_{n-1}$

c. $t_1 = 20\ 000, t_n = \frac{t_{n-1}}{0.9}$

d 11. Which of the given formulas for the general term of the sequence $-12, -16, -20, -24, \dots$ is correct?

a. $t_n = -4n - 12$

c. $t_n = 4n - 8$

b. $t_n = 4n - 12$

d. $t_n = -4n - 8$

12. The first three terms of the sequence defined by $f(n) = \frac{3n+2}{5}$ are

a. $1, \frac{8}{5}, \frac{11}{5}$

c. $\frac{2}{5}, 1, \frac{8}{5}$

b. $\frac{3}{5}, \frac{6}{5}, \frac{9}{5}$

d. $0, \frac{2}{5}, 1$

10. ANS: A

11. ANS: D

12. ANS: A

⑪ arithmetic

$a = -12$

$d = -16 - (-12)$
 $= -4$

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

$$= -12 + (n-1)(-4)$$

$$= -12 - 4n + 4$$

$$\therefore t_n = -4n - 8$$

⑩ Geometric

$r = 100\% - 10\%$
 $= 90\%$
 $= 0.9$

$a = 20000$

$$t_n = r t_{n-1}, t_1 = 20000, n > 1$$

$$t_1 = 20000, t_n = 0.9 t_{n-1}, \text{ where } n > 1$$

13. The ninth term in the sequence $\frac{2}{3}, 1, \frac{3}{2}, \frac{9}{4}, \dots$ is

a. $\frac{81}{16}$

c. $\frac{729}{64}$

b. $\frac{243}{32}$

d. $\frac{2187}{128}$

14. The sum of an arithmetic series where $a = 3, t_5 = 15$, and $n = 5$ is

a. 18

c. 30

b. 45

d. 27

13. ANS: D

14. ANS: B

The practice test does not include Binomial Expansion. Please also complete p466 #5 (a), (b) and (f) and p466 #10 as preparation for this section of the unit test

Review Homework

p468, 469 #3, 4, 7, 8, 9, 14, 16,
18, 19, 22, 23

