**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Recursive and Explicit Formulas**

1. What is the value of the 5th term in the sequence if a1 = 2 and an = an – 1 – 6?
2. Find the value of the 6th term in the sequence if a1 = -1 and an+1 = an – 4?
3. Use the formula an = an -1 + 5 to determine the 4th term in the sequence if a1 = 4.
4. The first term of an arithmetic sequence is a1 = 14, and the common difference is 6. Write an explicit formula in simplest form. Find the 12th term.
5. The first term of an arithmetic sequence is a1 = 52, and the common difference is -5. Write an explicit formula in simplest form then find a20.

**For problems 4 – 6, write the explicit and recursive formula for the sequences or data shown below.**

1. 2, 5, 8, 11, 14, 17
2. 4, 9, 14, 19, 24, 29

|  |  |
| --- | --- |
| ***n*** | ***f(n)*** |
| 1 | 3 |
| 2 | 6 |
| 3 | 9 |
| 4 | 12 |
| 5 | 15 |

1. Write the explicit and recursive function for the sequence: 2, 6, 18, 54, 162 …

Recursive:

Explicit:

1. The population of Pitcaim Islands in 2005 was 50 people. Every year since, the population has increased by 100. Write an explicit and a recursively defined function to model the population since 2005. (Complete the table to help you)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year |  |  |  |  |  |  |
| # of years since 2005 |  |  |  |  |  |  |
| Population |  |  |  |  |  |  |

What is the population in 2013?

1. Write the explicit formula for arithmetic or linear sequence:

Formula: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a1 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

d = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

an = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Write the explicit formula for geometric or exponential sequences:

Formula: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a1 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

r = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

an = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How could you rewrite this formula to simplify the exponent?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Read each question. Circle the letter that contain the correct answer to the question or complete the problem in the space provided.**

1. The linear function y = 20 + 60x describes the distance traveled by a student who began 20 miles away from home and continued driving 60 miles an hour for x hours. What is the recursive formula to describe the same situation?
2. an = an+1 + 60; a1 = 20
3. an = 60 - an+1 ; a1 = 60
4. an+1 = an + 60; a1 = 60
5. an+1 = an + 60; a1 = 80
6. The formula below shows how to find the next term if you know the previous term in the series. Determine the value of the 6th term: an = an – 1 + 4, a1 = 0.
7. 16
8. 20
9. 24
10. 28
11. Kim began a stamp collection with 24 stamps. Each week, she added 3 more stamps to the collection. Which function represents the number of stamps Kim would have in her collection in *n* weeks?
12. f(n) = 24n + 3
13. f(n) = 3n + 24
14. fn = fn – 1 + 3; f1 = 24
15. fn = fn – 1+ 24; f1 = 3
16. Use the formula show to determine the 5th term in the sequence. an = an – 1 + 3 ; a1 = 6
17. 18
18. 24
19. 27
20. 30
21. The recursive function an + 1 = an + ½ with a1 = 7/2 describes the length of a row of shopping carts stacked together. Which linear function describes the same situation?
22. y = 4x + ½
23. y = 4x + 7/2
24. y = 1/2x + 3
25. y = 1/2x + 7/2
26. Which of the functions below describes the total cost of hosting a party if you pay $100 to rent the room and $5 per party guest?
27. y + 100 = 5x
28. y = 100x + 5
29. an + 1 = an + 5; a0 = 100
30. an + 1 + an + 100; a0 = 5
31. Which equation represents the data in the table below?

|  |  |
| --- | --- |
| ***x*** | ***f(x)*** |
| 1 | 9 |
| 2 | 11 |
| 3 | 13 |
| 4 | 15 |
| 5 | 17 |

1. f(x) = 9x + 2
2. f(x) = 9 + (x – 2)
3. fx = fx – 1 + 9 ; f1= 2
4. fx = fx – 1 + 2; f1 = 9
5. The rule tn + 1 = tn + 2 has t1 = -10. Find the values of tn for n = 2 through n = 5.
6. Develop an explicit and a recursive linear function to model the situation below

“The cost of enrolling in the community college is $75 for registration fees plus $15 per credit hour of course enrollment. Express the cost of a semester of college as a function of course credit hours.”

1. A chain e-mail instructs the recipient to forward the e-mail to four more people. The table shows the number of rounds of sending the e-mail and the number of new e-mails generated. Write a recursive rule for the nth term of the sequence. The find terms 5, 6, 7, and 8.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| # of rounds sending e-mail, *n* | 1 | 2 | 3 | 4 |
| # of new e-mails generated, *an* | 1 | 4 | 16 | 64 |