



Coordinate Algebra EOC (GSE) Quiz Answer Key

Functions - (MGSE9-12.F.BF.1a) Explicit Expression

Student Name: _____

Date: _____

Teacher Name: THUYNGA DAO

Score: _____

1)

position	number
1	6
2	7
3	8
4	9
n	?

Consider the sequence in the table. Which formula gives the number that would be in the nth position of the sequence?

- A) $5n$
- B) $10n$
- C) $n + 5$**
- D) $n - 5$

Explanation:

$n + 5$ is correct. Test this with each position to see that the right numbers are produced.

2) Sally graphs the geometric sequence $a_n = 2(3)^{n-1}$ on a coordinate plane where she plots a_n on the y-axis and n on the x-axis. This graph is the same as the graph of which type of function?

- A) cubic
- B) linear
- C) quadratic
- D) exponential**

Explanation:

The parent function of an exponential function is $y = a^x$. Since the variable is the exponent in the geometric sequence, it is **exponential**.

3)

32, 16, 8, 4, 2, ...

Find the common ratio of the given sequence, and write an exponential function which represents the sequence.

- A) 2; $f(x) = 32(2)^{x-1}$
- B) $\frac{1}{2}$; $f(x) = 32^{\frac{1}{2}x-1}$
- C) 2; $f(x) = 32\left(\frac{1}{2}\right)^{x-1}$
- D) $\frac{1}{2}$; $f(x) = 32\left(\frac{1}{2}\right)^{x-1}$**

Explanation:

Since each term is multiplied by $\frac{1}{2}$ to get to the next term, the common ratio is $\frac{1}{2}$. The common ratio is also the base of an exponential function. The correct answer is $\frac{1}{2}$; $f(x) = 32\left(\frac{1}{2}\right)^{x-1}$.

4) Dustin's starting salary is \$40,000. His salary is expected to increase by 4% each year. To the nearest dollar, what is Dustin's expected salary after 5 years?

- A) \$42,988
- B) \$43,455
- C) **\$48,666**
- D) \$51,033

Explanation:

$$40000(1.04)^5 = \$48,666.$$

5) What expression shows the relationship between the value of any term and n , its position in the sequence for the given sequence?

2, 1, 0, -1, -2, ...

- A) $2n$
- B) $n + 3$
- C) $2n + 1$
- D) $-n + 3$

Explanation:

Each term decreases by 1 unit so the common difference is -1 and there must be a negative in the expression. Then plug in 1 into the equations that have a slope of -1 and see if you get 2 out. You do for $-n + 3$.

6) What is the closed linear form of the sequence 3, 4, 5, 6, 7, ...?

- A) $a_n = 2 + n$
- B) $a_n = 2 - n$
- C) $a_n = 3 + n$
- D) $a_n = 3 - n$

Explanation:

The closed linear form formula is $a_n = a_1 + (n - 1)d$ where a_1 is the first term and d is the common difference. So plugging in 3 for a_1 and 1 for d you should get $a_n = 2 + n$.

7) What expression shows the relationship between the value of any term and n , its position in the sequence for the given sequence?

10, 5, 0, -5, -10, ...

- A) $-5n$
- B) $-5n + 15$
- C) $-3n + 15$
- D) $5n$

Explanation:

Each term decreases by 5 units so the common difference is -5 and there must be a negative in the expression. Then plug in 1 into the equations that have a slope of -5 and see if you get 10 out. You do for $-5n + 15$.

8)

2, 11, 20, 29, 38, 47, 56,...

Jane is given this sequence and is asked to write the definition. Which definition describes the sequence.

- A) You add 9 to every term to find the sequence.
- B) The first term is 2 and every term after the first is 9 more than the first term.
- C) The first term is 2 and every term after the first is 9 more than the preceding term.
- D) The first term is 2 and every term after the first is 7 more than the preceding term.

Explanation:

The correct answer is The first term is 2 and every term after the first is 9 more than the preceding term. You have to start with the number on the left so the first term is 2 and then determine how much you added between each term which is 9. You add that to the preceding term. If you added to the first term your sequence would not get above 11.

9) What is the closed linear form of the sequence of the negative even integers starting with -2?

- A) $a_n = 2n$
- B) $a_n = -2n$
- C) $a_n = -2 - n$
- D) $a_n = -2 + 2n$

Explanation:

The closed linear form formula is $a_n = a_1 + (n - 1)d$ where a_1 is the first term and d is the common difference. So plugging in -2 for a_1 and -2 for d you should get $a_n = -2n$.

10)

81, 27, 9, 3,...

Find the common ratio of the given sequence, and write an exponential function which represents the sequence. Use $n = 1, 2, 3, \dots$

- A) 3; $f(n) = 81^{n-1}$
- B) 3; $f(n) = 81(3)^{n-1}$
- C) $\frac{1}{3}$; $f(n) = 81(3)^{n-1}$
- D) $\frac{1}{3}$; $f(n) = 81\left(\frac{1}{3}\right)^{n-1}$

Explanation:

Since each term is multiplied by $\frac{1}{3}$ to get to the next term, the common ratio is $\frac{1}{3}$. The common ratio is also the base of an

exponential function. The correct answer is $\frac{1}{3}$; $f(n) = 81\left(\frac{1}{3}\right)^{n-1}$

11)

	A	B
1	Month	Print Jobs
2	January	5
3	February	13
4	March	37
5	April	109
6	May	325
7	June	973
8	July	2,917
9	August	8,749
10	September	26,245

A rapidly growing company has noticed that the number of monthly print jobs sent to its printer has followed a pattern over the last 9 months, and they constructed a spreadsheet to display their data.

If they manually typed in the number 5 into cell B2, entered a formula into cell B3, and copied the formula to cells B4 through B10, which of these formulas did they enter into cell B3?

- A) $2 * B2 + 3$
- B) $3 * B2 - 2$
- C) $4 * B2 - 7$
- D) $5 * B2 - 12$

Explanation:

It is already known that the first 3 terms in the sequence of monthly print jobs are 5, 13, 37, with 5 appearing in cell B2, 13 appearing in cell B3, and 37 appearing in cell B4. If 13 is substituted into the formula $2 * B3 + 3$, the result is $(2)(13) + 3 = 26 + 3 = 29$, so this cannot be the correct answer. Also, if 13 is substituted into the formula $4 * B3 - 7$, the result is $(4)(13) - 7 = 52 - 7 = 45$, so this cannot be the correct answer. Finally, if 13 is substituted into the formula $5 * B3 - 12$, the result is $(5)(13) - 12 = 65 - 12 = 53$, so this cannot be the correct answer. Therefore, since when 13 is substituted into the formula $3 * B3 - 2$, the result is $(3)(13) - 2 = 39 - 2 = 37$, the correct answer must be $3 * B2 - 2$.

12) Tara is trying to find the n th term of the arithmetic sequence 5,8,11, and 14... Which expression can Tara use to find the n th term? What is the 15th term of the sequence?

- A) $(n - 1)3; 42$
- B) $(n + 1)3; 48$
- C) $5 + (n - 1)3; 47$
- D) $5 + (n + 1)3; 53$

Explanation:

$$5 + (n - 1)3; 47$$

To find the n th term, add the first term in the sequence to the product of the $(n$ th term - 1) times the common difference.

$$5 + (n - 1)3$$

To find the 15th term:

$$5 + (15 - 1)3$$

$$5 + 14(3)$$

13) What is the closed linear form of the sequence 5, 7.5, 10, 12.5, 15,...

- A) $a_n = 5 + 2.5n$
- B) $a_n = 5 - 2.5n$
- C) $a_n = 2.5 + 2.5n$
- D) $a_n = 2.5 - 2.5n$

Explanation:

The closed linear form formula is $a_n = a_1 + (n - 1)d$ where a_1 is the first term and d is the common difference. So plugging in 5 for a_1 and 2.5 for d you should get $a_n = 2.5 + 2.5n$.

14) What is the closed linear form for this sequence given $a_1 = 0.3$ and $a_{n+1} = a_n + 0.75$?

- A) $a_n = 0.45 - 0.75n$
- B) $a_n = 0.45 + 0.50n$
- C) $a_n = -0.45 + 0.75n$
- D) $a_n = -0.45 - 0.75n$

Explanation:

To find the closed linear form the formula is $a_n = a_1 + (n - 1)d$, so a_1 is 0.3 and d is 0.75 so plugging in you get $a_n = -0.45 + 0.75n$.

15) Bicycle rental on the seawall at the beach cost a mandatory minimum of \$5 for the first hour and then \$4 for each additional hour. When three or more bikes are rented together, the owner gives a 20% discount on the additional hours. If Marty and his family rent four bicycles, identify the expression which represents the cost.

- A) $12.8x + 20x$
- B) $12.8x + 20$
- C) $12.8x + 16x$
- D) $32.80x$

Explanation:

$12.8x + 20$

$(4 \times 5) + (4 \times 4)(1 - .20)x$
 $20 + 16(.80)x$
 $12.8x + 20$

16) What is the closed linear form for this sequence given $a_1 = 27$ and $a_{n+1} = a_n - 2$?

- A) $a_n = 14 - n$
- B) $a_n = 30 + 2n$
- C) $a_n = 27 + 4n$
- D) $a_n = 29 - 2n$

Explanation:

To find the closed linear form the formula is $a_n = a_1 + (n - 1)d$, so a_1 is 27 and d is -2 so plugging in you get $a_n = 29 - 2n$.

17) What is the closed linear form for this sequence given $a_1 = -15$ and $a_{n+1} = a_n - 8$?

- A) $a_n = 7 - 8n$
- B) $a_n = -7 + 8n$
- C) $a_n = -7 - 8n$
- D) $a_n = -15 - 8n$

Explanation:

To find the closed linear form the formula is $a_n = a_1 + (n - 1)d$, so a_1 is -15 and d is -8 so plugging in you get $a_n = -7 - 8n$.

18) What is the closed linear form for this sequence given $a_1 = 14$ and $a_{n+1} = a_n - 2$?

- A) $a_n = 16 + 2n$
- B) $a_n = 16 - 2n$
- C) $a_n = 14 + 2n$
- D) $a_n = 14 - 2n$

Explanation:

To find the closed linear form the formula is $a_n = a_1 + (n - 1)d$, so a_1 is 14 and d is -2 so plugging in you get $a_n = 16 - 2n$.

19) What is the closed linear form of the sequence of the odd integers starting with 1.

- A) $a_n = 1 + 2n$
- B) $a_n = 1 - 2n$
- C) $a_n = -1 + 2n$
- D) $a_n = -1 - 2n$

Explanation:

The closed linear form formula is $a_n = a_1 + (n - 1)d$ where a_1 is the first term and d is the common difference. So plugging in 1 for a_1 and 2 for d you should get $a_n = -1 + 2n$.

20) A car rental cost \$50 for the first day. Additional days cost \$35 day. If a car is rented for more than a week the company gives a 10% discount on the additional days.

Identify the expression which represents the cost of renting a car if the car has been rented for more than a week.

- A) $45 + 35x$
- B) $45 + 31.5x$
- C) $50 + 35x$
- D) $50 + 31.5x$

Explanation:

$50 + 31.5x$

$50 + 35(1 - .10)x$

$50 + 35(.9)x$

$50 + 31.5x$

21) What is the closed linear form for this sequence given $a_1 = 13$ and $a_{n+1} = a_n + 4$?

- A) $a_n = 9 + 4n$
- B) $a_n = 9 - 4n$
- C) $a_n = 13 + 4n$
- D) $a_n = 13 + 4n - 1$

Explanation:

To find the closed linear form the formula is $a_n = a_1 + (n - 1)d$, so a_1 is 13 and d is 4 so plugging in you get $a_n = 9 + 4n$.

22) Molly owes her brother \$300. She works for \$10 per hour as a checker at the local grocery store. Molly plans to repay her brother half of what she earns after taxes of 20% are taken out. Identify the expression which represents the condition described.

- A) $300 - 4x$
- B) $300 - 8x$
- C) $300 - 5x$
- D) $300 - 6x$

Explanation:

$300 - 4x$

$300 - 10(1 - .20)(.50)x$

$300 - 10(.80)(.50)x$

23) Frazier has \$1,200 in savings. He works because he is saving money for college, and he earns \$9 an hour. If Frazier saves 25 percent of his net pay, after 20 percent is taken out for tax, identify the expression which represents Frazier's savings.

- A) $1.8x + 1,200$
- B) $3.6x + 1,200$
- C) $7.2x + 1,200$
- D) $9x + 1,200$

Explanation:

$$1.8x + 1,200$$

$$9(1 - .20)(.25)x + 1200$$

$$9(.80)(.25)x + 1200$$

$$9(.20)x + 1200$$

$$1.8x + 1200$$

24) Donna has a new job. Her annual starting salary is \$17,600. She will receive a raise of \$850 each year. Which expression models her salary n years from now? What will Donna's salary be 5 years from now?

- A) $17600 + 850(n - 1)$; \$21,000
- B) $17600 + 850(n + 1)$; \$22,700
- C) $17600 - 850(n - 1)$; \$24,200
- D) $17600 + 850n$; \$21,850

Explanation:

$$17600 + 850(n - 1); \$21,000$$

Donna's yearly salaries form an arithmetic sequence.

Let n = years from now

$$17600 + 850(n - 1)$$

t_n is the term in the sequence

In this problem, t_5 denotes the fifth year.

$$t_5 = 17600 + 850(5 - 1)$$

$$t_5 = 17600 + 850(4)$$

$$t_5 = \$21,000$$

25) The cost of a newsletter subscription is \$20 per year. The cost is expected to increase 10% each year. Which expression can be used to find the cost n years from now? What will the expected cost be in 3 years?

- A) $20(1.1)^{(n - 1)}$; \$24.20
- B) $20(1.1)^n$; \$26.62
- C) $20(1.1)^{(n + 1)}$; \$29.28
- D) $20(1.1)^{(n + 2)}$; \$32.21

Explanation:

$$20(1.1)^{(n - 1)}; \$24.20$$

Since the cost is increasing by a percent each year, this is a geometric sequence. To find the n th term, change the percent to a decimal. Add the increase to 100%, expressed as 1. The number of years from now is represented by n

$$20(1.1)^{(n - 1)}$$

To find the cost 3 years from now, substitute 3 in for n and simplify.

$$20(1.1)^{(3 - 1)}$$

$$\$24.20$$