Name: _____ **Class:** _____ **Date:** _____ **ID: A**

Algebra 2 SIA #3 Review

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

____ 1. Let $f(x) = -5x - 4$ and $g(x) = 6x - 7$. Find $f(x) + g(x)$.
a. $-11x + 3$ b. $x + 3$ c. $-11x - 11$ d. $x - 11$

____ 2. Let $f(x) = 4x - 5$ and $g(x) = 6x - 3$. Find $f(x) - g(x)$.
a. $10x - 8$ b. $10x - 2$ c. $-2x - 8$ d. $-2x - 2$

____ 3. Let $f(x) = 3x + 2$ and $g(x) = x - 3$. Find $f(x) - g(x)$.
a. $2x - 5$ b. $2x + 5$ c. $4x - 1$ d. $2x - 1$

____ 4. Let $f(x) = 3x + 2$ and $g(x) = 7x + 6$. Find $f \cdot g$ and its domain.
a. $6x^2 + 4x + 42$; all real numbers except $x = -\frac{2}{3}$
b. $6x^2 + 4x + 42$; all real numbers
c. $21x^2 + 32x + 12$; all real numbers
d. $21x^2 + 32x + 12$; all real numbers except $x = -\frac{6}{7}$

____ 5. Let $f(x) = 3x - 6$ and $g(x) = x - 2$. Find $\frac{f}{g}$ and its domain.
a. 3; all real numbers
b. 3; all real numbers except $x = 2$
c. 1; all real numbers
d. –3; all real numbers except $x = 3$

____ 6. Let $f(x) = x^2 - 16$ and $g(x) = x + 4$. Find $\frac{f}{g}$ and its domain.
a. $x + 4$; all real numbers except $x \neq 4$
b. $x + 4$; all real numbers except $x \neq -4$
c. $x - 4$; all real numbers except $x \neq 4$
d. $x - 4$; all real numbers except $x \neq -4$

____ 7. Let $f(x) = -2x - 7$ and $g(x) = -4x + 3$. Find $(f \circ g)(-5)$.
a. 23 b. –53 c. –9 d. 3

____ 8. Let $f(x) = x^2 + 6$ and $g(x) = \frac{x + 8}{x}$. Find $\left(g \circ f\right)(-7)$.
a. $-\frac{55}{7}$ b. $\frac{384}{7}$ c. $\frac{295}{49}$ d. $\frac{63}{55}$

____ 9. Let $f(x) = x + 2$ and $g(x) = x^2$. Find $\left(g \circ f\right)(-5)$.
a. 9 b. –3 c. 49 d. –10

____ 10. You have a coupon good for $6 off the price of any large pizza. You also get a 20% discount on any pizza if you show your student ID. How much more would you pay for a large pizza if the cashier applies the coupon first?

a. $1.50
b. $0.00
c. $1.20
d. $.50

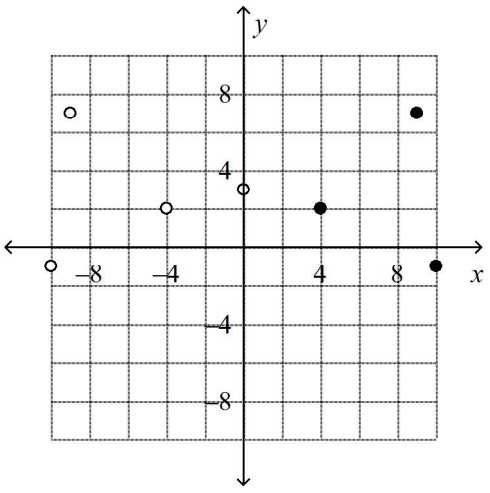
____ 11. A store is offering a 25% discount on all items. Also, employees get a 10% employee discount. If you are an employee which discount would you want to be applied first to save the most money?

a. 10%
b. 25%
c. It doesn't matter which discount is applied first, the result is the same.
d. Not enough information is given.

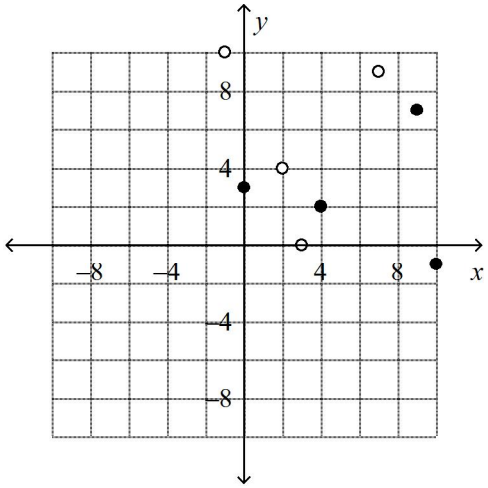
____ 12. Graph the relation and its inverse. Use open circles to graph the points of the inverse.

x	0	4	9	10
y	3	2	7	–1

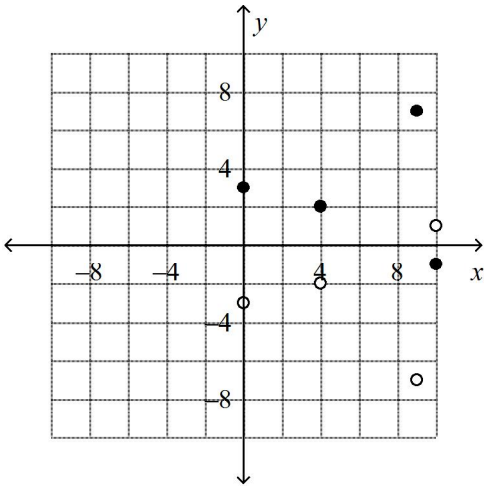
a.



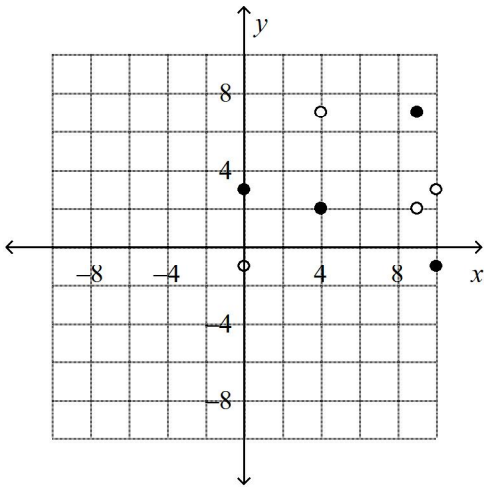
c.



b.



d.



____ 13. Is relation *t* a function? Is the inverse of relations *t* a function?

Relation *t*

x	0	2	4	6
y	–8	–7	–4	–4

a. Relation *t* is not a function. The inverse of relation *t* is a function.
b. Relation *t* is not a function. The inverse of relation *t* is not a function.
c. Relation *t* is not a function. The inverse of relation *t* is a function.
d. Relation *t* is a function. The inverse of relation *t* is not a function.

What is the inverse of the given relation?

____ 14. $y = 7x^2 - 3$.

a. $y = \pm\sqrt{\dfrac{x+3}{7}}$

b. $x = \sqrt{\dfrac{y+3}{7}}$

c. $y^2 = \dfrac{x-3}{7}$

d. $y = \pm\sqrt{\dfrac{x-3}{7}}$

____ 15. $y = 3x + 9$

a. $y = \dfrac{1}{3}x + 3$

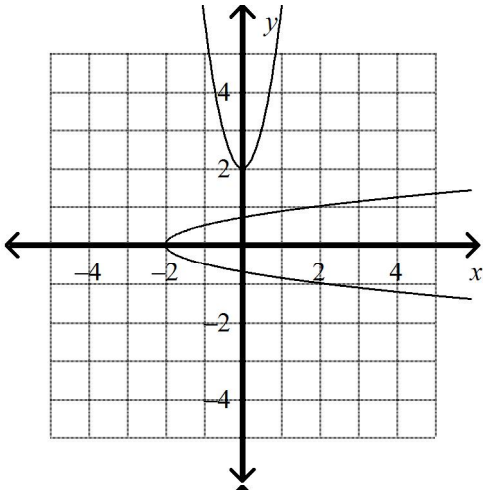
b. $y = 3x - 3$

c. $y = 3x + 3$

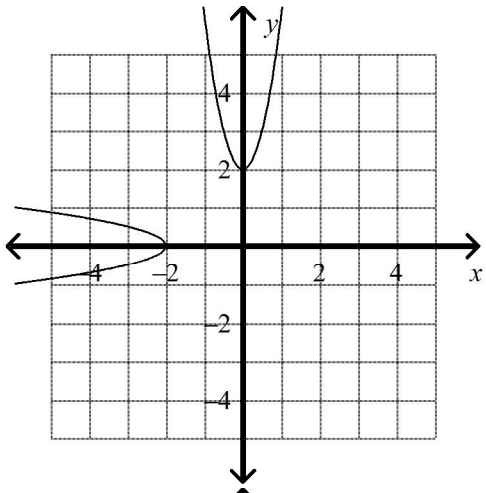
d. $y = \dfrac{1}{3}x - 3$

____ 16. Graph $y = -4x^2 - 2$ and its inverse.

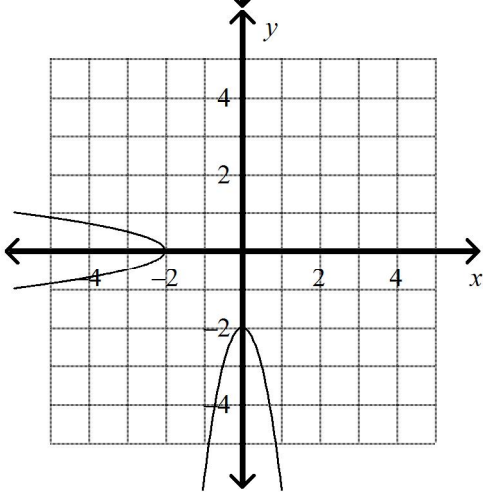
a.



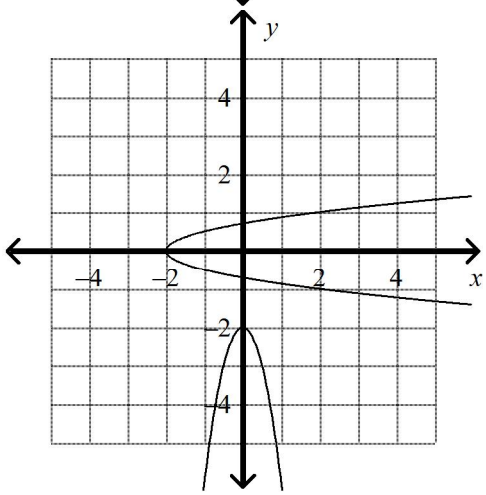
c.



b.

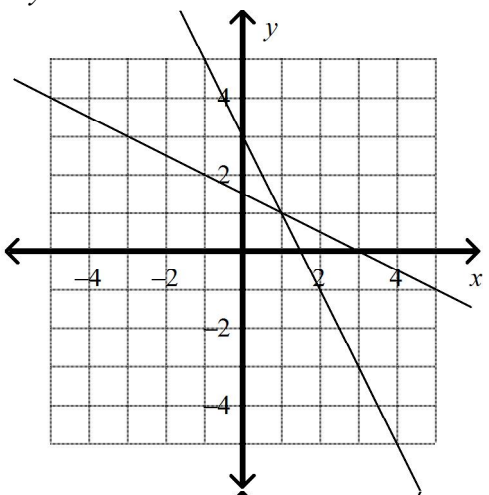


d.

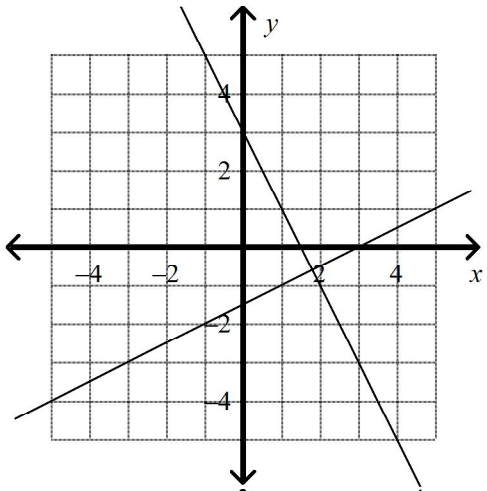


____ 17. Graph $y = -2x + 3$ and its inverse.

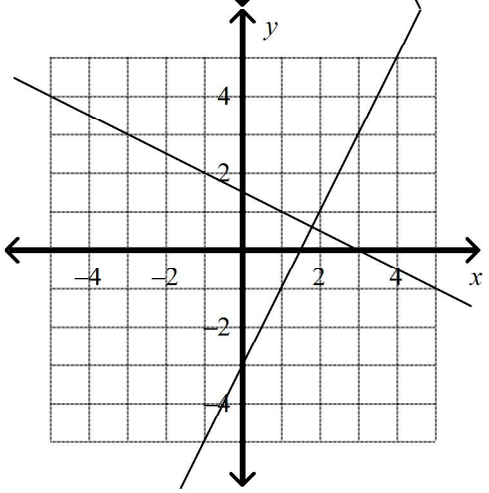
a.



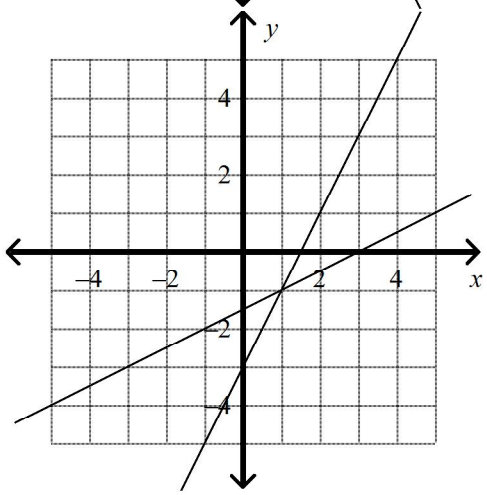
c.



b.



d.



____ 18. For the function $f(x) = (8 - 2x)^2$, find f^{-1}. Determine whether f^{-1} is a function.

a. $f^{-1}(x) = \pm\sqrt{\dfrac{8 + x}{2}}$; f^{-1} is not a function.

b. $f^{-1}(x) = \dfrac{8 \pm \sqrt{x}}{2}$; f^{-1} is not a function.

c. $f^{-1}(x) = \pm\sqrt{\dfrac{8 + x}{2}}$; f^{-1} is a function.

d. $f^{-1}(x) = \dfrac{8 \pm \sqrt{x}}{2}$; f^{-1} is a function.

____ 19. For the function $f(x) = \sqrt{x - 5}$, find f^{-1}. What is the range of f^{-1}?

a. $f^{-1}(x) = x^2 + 25; y \geq 25$

b. $f^{-1}(x) = x^2 + 25; y \geq 5$

c. $f^{-1}(x) = x^2 + 5; y \geq 25$

d. $f^{-1}(x) = x^2 + 5; y \geq 5$

____ 20. Police can estimate the speed of a vehicle before the brakes are applied using the formula $0.75d = \frac{s^2}{30.25}$, where s is the speed in miles per hour and d is the length of the vehicle's skid marks. What was the approximate speed of a vehicle that left a skid mark measuring 100 feet?

a. about 29 miles per hour
b. about 10 miles per hour
c. about 48 miles per hour
d. about 43 miles per hour

____ 21. The function $d = 4.9t^2$ represents the distance d, in meters, that an object falls in t seconds due to Earth's gravity. Find the inverse of this function. How long, in seconds, does it take for a cliff diver who is 70 meters above the water to reach the water below?

a. 3.8 seconds
b. 5.9 seconds
c. 8.1 seconds
d. 13.8 seconds

____ 22. For the function $f(x) = x + 9$, find $(f \circ f^{-1})(5)$.

a. 14 b. 5 c. –5 d. 25

____ 23. For the function $g(x) = \frac{14}{x+3}$, find $(g^{-1} \circ g)(4)$.

a. 6 b. 10 c. 4 d. 0

Generate the first five terms in the sequence using the explicit formula.

____ 24. $y_n = -5n - 5$

a. –30, –25, –20, –15, –10
b. 30, 25, 20, 15, 10
c. –10, –15, –20, –25, –30
d. 10, 15, 20, 25, 30

____ 25. $c_n = 12n - 11$

a. 49, 37, 25, 13, 1
b. –1, –13, –25, –37, –49
c. 1, 13, 25, 37, 49
d. –49, –37, –25, –13, –1

____ 26. What is the 15^{th} term in the sequence using the given formula?

$c_n = 3n - 1$

a. 14
b. 57
c. 44
d. –44

____ 27. Write a recursive formula for the sequence 7, 13, 19, 25, 31, ... Then find the next term.

a. $a_n = a_{n-1} + 6$, where $a_1 = 7$; 37
b. $a_n = a_{n-1} + 6$, where $a_1 = 37$; 7
c. $a_n = a_{n-1} - 6$, where $a_1 = 6$; –23
d. $a_n = a_{n-1} - 6$, where $a_1 = 7$; 37

____ 28. Write a recursive formula for the sequence 7, 4, 1, –2, –5, ... Then find the next term.

a. $a_n = a_{n-1} - 3$, where $a_1 = -8$; 7
b. $a_n = a_{n-1} - 3$, where $a_1 = 7$; –8
c. $a_n = a_{n-1} + 3$, where $a_1 = -3$; 22
d. $a_n = a_{n-1} + 3$, where $a_1 = 7$; –8

____ 29. Write a recursive formula for the sequence 15, 26, 48, 92, 180, ... Then find the next term.

a. $a_n = 2a_{n-1} - 4$, where $a_1 = 15$; 356
b. $a_n = 2a_n - 4$, where $a_1 = 15$; 356
c. $a_n = 4 + 11 \cdot 2^{n-1}$, where $a_1 = 15$; 356
d. $a_n = 3a_{n-1} - 19$, where $a_1 = 15$; 356

____ 30. Write an explicit formula for the sequence 8, 6, 4, 2, 0, ... Then find a_{14}.

a. $a_n = -2n + 10$; –16
b. $a_n = -2n + 8$; –18
c. $a_n = -2n + 8$; –20
d. $a_n = -2n + 10$; –18

____ 31. Write an explicit formula for the sequence $\frac{1}{2}, \frac{3}{7}, \frac{1}{3}, \frac{5}{19}, \frac{3}{14}$, ... Then find a_{14}.

a. $a_n = a_{n-1} - \frac{n-1}{7n}; \frac{15}{199}$
b. $a_n = \frac{a_{n+1}}{n^2+3}; \frac{15}{199}$
c. $a_n = \frac{n+1}{n^2+3}; \frac{15}{199}$
d. $a_n = \frac{n}{n^3-1}; \frac{15}{199}$

____ 32. Suppose you drop a tennis ball from a height of 8 feet. After the ball hits the floor, it rebounds to 80% of its previous height. How high will the ball rebound after its third bounce? Round to the nearest tenth.

a. 3.3 feet
b. 4.1 feet
c. 5.1 feet
d. 1 feet

____ 33. Orlando is making a design for a logo. He begins with a square measuring 24 inches on a side. The second square has a side length of 19.2 inches, and the third square has a side length of 15.36 inches. Which square will be the first square with a side length of less than 12 inches?

a. fourth square
b. fifth square
c. sixth square
d. seventh square

____ 34. The table shows the predicted growth of a particular bacteria after various numbers of hours. Write an explicit formula for the sequence of the number of bacteria.

Hours (*n*)	1	2	3	4	5
Number of Bacteria	21	42	63	84	105

a. $a_n = 21n$
b. $a_n = \frac{1}{21}n$
c. $a_n = n + 21$
d. $a_n = 21n + 21$

Is the sequence arithmetic? If so, identify the common difference.

____ 35. 13, 20, 27, 34, ...
a. yes; 7 b. yes; –7 c. yes; 13 d. no

____ 36. 14, 21, 42, 77, ...
a. yes; 7 b. yes; –7 c. yes; 14 d. no

____ 37. –2.4, 9.8, 22, 34.2, ...
a. yes; 12 b. yes; 12.2 c. yes; 12.3 d. no

____ 38. Find the 50th term of the sequence 5, –2, –9, –16, ...
a. –352 b. –343 c. –338 d. –331

____ 39. Find the 110 term of the sequence –7, 3, 13, 23, ...
a. 1083 b. –1097 c. 1093 d. 40

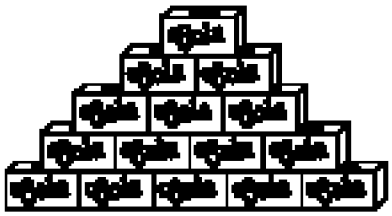
____ 40. Find the 2nd and 3rd term of the sequence –7, ___, ___, –22, –27, ...
a. –12, –15 b. –17, –12 c. –10, –17 d. –12, –17

____ 41. Find the missing term of the arithmetic sequence 22, ■, 34, ...
a. 46 b. 16 c. 28 d. 40

____ 42. Find the arithmetic mean a_n of $a_{n-1} = 3.9$ and $a_{n+1} = 7.1$.
a. 11 b. 5.5 c. 3.7 d. 1.6

____ 43. Viola makes gift baskets for Valentine's Day. She has 13 baskets left over from last year, and she plans to make 12 more each day. If there are 15 work days until the day she begins to sell the baskets, how many baskets will she have to sell?
a. 193 baskets
b. 156 baskets
c. 205 baskets
d. 181 baskets

____ 44. A grocery clerk sets up a display of 12-pack cartons of cola. There are 15 cartons at the base of the triangle and one at the top. How many cartons of cola are needed for the complete display?



a. 180 cartons
b. 30 cartons
c. 120 cartons
d. 15 cartons

Is the sequence geometric? If so, identify the common ratio.

____ 45. 6, 12, 24, 48, ...
a. yes; 2 b. yes; –2 c. yes; 4 d. no

____ 46. 2, –4, –16, –36, ...
a. yes; –2 b. yes; 2 c. yes; –3 d. no

____ 47. $\frac{1}{3}, \frac{2}{9}, \frac{4}{27}, \frac{8}{81}, \frac{16}{243}, \ldots$

a. yes; $\frac{2}{3}$
b. yes; $\frac{1}{9}$
c. yes; $\frac{1}{6}$
d. not geometric

What is the fifth term of the geometric sequence?

____ 48. 5, 15, 45, ...

a. 1215
b. 1875
c. 405
d. 3645

____ 49. $a_1 = 120, a_2 = 36, a_3 = 10.8, a_6 = 0.2916$
a. 0.87
b. 3.33
c. 25.2
d. 0.972

Write the explicit formula for the geometric sequence. Then find the fifth term in the sequence.

____ 50. $a_1 = -4, a_2 = 8, a_3 = -16$
a. $a_n = -4 \cdot (2)^n$; –64
b. $a_n = -4 \cdot (-2)^{n-1}$; –64
c. $a_n = -4 \cdot (-2)^n$; 128
d. $a_n = -2 \cdot (-4)^{n-1}$; –512

____ 51. Kaylee is painting a design on the floor of a recreation room using equilateral triangles. She begins by painting the outline of Triangle 1 measuring 50 inches on a side. Next, she paints the outline of Triangle 2 inside the first triangle. The side length of Triangle 2 is 80% of the length of Triangle 1. She continues painting triangles inside triangles using the 80% reduction factor. Which triangle will first have a side length of less than 29 inches?

a. Triangle 4
b. Triangle 3
c. Triangle 5
d. Triangle 6

____ 52. A rope is swinging in such a way that the length of the arc is decreasing geometrically. If the first arc is 18 feet long and the third arc is 8 feet long, what is the length of the second arc?

a. 12 feet b. 10 feet c. 5 feet d. 72 feet

What is a possible value for the missing term of the geometric sequence?

____ 53. 50, ■ , 450, ...

a. 1350 b. 150 c. 3 d. 53

____ 54. 1250, ■ , 50, ...

a. 1200 b. 650 c. 250 d. 125

____ 55. 39, ■ , 975, ...

a. –44 b. –195 c. –5 d. –4875

What is the sum of the finite arithmetic series?

____ 56. $26 + 29 + 32 + 35 + 38 + 41 + 44$

a. 219
b. 245
c. –193
d. 201

____ 57. $7.6 + 6.3 + 5 + 3.7 + 2.4 + 1.1 + (–0.2) + (–1.5)$

a. 17.4
b. 24.4
c. 27.8
d. 36.4

____ 58. $29 + 32 + 35 + 38 + 41 + \ldots + 59$

a. 234
b. 425
c. 484
d. 455

____ 59. $(–5) + 0 + 5 + 10 + \ldots + 65$

a. 900 b. 455 c. 450 d. 445

____ 60. A large asteroid crashed into a moon of a planet, causing several boulders from the moon to be propelled into space toward the planet. Astronomers were able to measure the speed of one of the projectiles. The distance (in feet) that the projectile traveled each second, starting with the first second, was given by the arithmetic sequence 26, 44, 62, 80, ... Find the total distance that the projectile traveled in seven seconds.

a. 534 feet b. 560 feet c. 212 feet d. 426 feet

____ 61. Use summation notation to write the series 49 + 54 + 59 + ... for 14 terms.

a. $\sum_{n=1}^{14}(49+5n)$ c. $\sum_{n=1}^{14}(44+5n)$

b. $\sum_{n=1}^{13}(44+5n)$ d. $\sum_{n=1}^{44}(49+5n)$

____ 62. Use summation notation to write the series 2 + 4 + 6 + 8 + ... for 10 terms.

a. $\sum_{n=1}^{10}2n$ b. $\sum_{n=1}^{10}(n+2)$ c. $\sum_{n=1}^{10}n$ d. $\sum_{n=0}^{10}2n$

____ 63. Use summation notation to write the series 6.6 + 15.4 + 24.2 + ... for 5 terms.

a. $\sum_{n=1}^{5}(-2.2+8.8n)$ c. $\sum_{n=0}^{4}(-2.2+8.8n)$

b. $\sum_{n=0}^{4}(8.8+6.6n)$ d. $\sum_{n=1}^{5}(8.8+6.6n)$

____ 64. Evaluate the series $\sum_{n=1}^{4}(n+4)$.

a. 26 b. 10 c. 16 d. –6

____ 65. Evaluate the series $\sum_{n=3}^{8}5n$.

a. 125 b. 38 c. 210 d. 165

____ 66. Use a calculator to evaluate the series $\sum_{x=1}^{85}2x+6$.

a. 7,820 c. 7,826
b. 4,165 d. 12,035

____ 67. Use a calculator to evaluate the series $\sum_{n=1}^{50}(n^2-2)$.

a. 42,825 c. 14,320
b. 4,285 d. 9,285

____ 68. Evaluate the series 1 + 4 + 16 + 64 + 256 + 1024.
a. 1365 b. 1364 c. 341 d. 5461

____ 69. What is S_7 for 6 – 24 + 96 – 384 + ... ?
a. 19,662 b. –78,642 c. –4914 d. 1230

____ 70. What is S_5 for 1000 + 500 + 250 + ... ?
a. 968.75 b. 1062.5 c. 1937.5 d. 12,500

____ 71. What is S_{10} for 1 + 2 + 4 + 8 + ... ?
a. 256.5 b. 511 c. 1023 d. 2047

____ 72. What is the sum of the geometric series $\sum_{x=1}^{10} 6(2)^x$?
a. 15,658 b. 6,138 c. 12,276 d. 756

____ 73. What is the sum of the geometric series $\sum_{x=0}^{15} 2(\frac{1}{2})^x$ rounded to the nearest whole number?
a. 4 b. 0 c. 2 d. 3

____ 74. Justine earned $26,000 during the first year of her job at city hall. After each year she received a 3% raise. Find her total earnings during the first five years on the job.
a. $138,037.53 b. $1,004,704.20 c. $4,020.51 d. $108,774.30

____ 75. A rubber ball dropped on a hard surface takes a sequence of bounces, each one $\frac{3}{5}$ as high as the preceding one. If this ball is dropped from a height of 10 feet, what is the total vertical distance it has traveled after it hits the surface the 5th time?
a. $23\frac{7}{125}$ feet b. $36\frac{14}{125}$ feet c. $43\frac{111}{125}$ feet d. $46\frac{14}{125}$ feet

____ 76. In June, Cory begins to save money for a video game and a TV he wants to buy in December. He starts with $20. Each month he plans to save 10% more than the previous month. How much money will he have at the end of December?
a. $154.31 b. $251.59 c. $228.72 d. $189.74

Does the infinite geometric series diverge or converge? Explain.

____ 77. $\frac{1}{5} + \frac{1}{10} + \frac{1}{20} + \frac{1}{40} + \ldots$
a. It diverges; it has a sum.
b. It diverges; it does not have a sum.
c. It converges; it has a sum.
d. It converges; it does not have a sum.

____ 78. 3 + 9 + 27 + 81 + …
a. It converges; it does not have a sum.
b. It diverges; it has a sum.
c. It diverges; it does not have a sum.
d. It converges; it has a sum.

Short Answer

79. Consider the infinite geometric series $\sum_{n=1}^{\infty} -4\left(\frac{1}{3}\right)^{n-1}$.
    a. Write the first four terms of the series.
    b. Does the series *diverge* or *converge*?
    c. If the series has a sum, find the sum.

Essay

80. The table shows how the number of sit-ups Marla does each day has changed over time. At this rate, how many sit-ups will she do on Day 12? Explain your steps in solving this problem.

Day 1	Day 2	Day 3	Day 4	Day 5
17	21	25	29	33

81. Dante is making a necklace with 18 rows of tiny beads in which the number of beads per row is given by the series 3 + 10 + 17 + 24 + ...
    a. Use summation notation to write the series. Explain what the numbers in the summation notation represent in this situation and how you found the expression used in the summation.
    b. Find the total number of beads in the necklace. Explain your method for finding the total number of beads.

Algebra 2 SIA #3 Review
Answer Section

MULTIPLE CHOICE

1. ANS: D PTS: 1 DIF: L3 REF: 6-6 Function Operations
   OBJ: 6-6.1 To add, subtract, multiply, and divide functions STA: MA.912.A.2.7| MA.912.A.2.8
   TOP: 6-6 Problem 1 Adding and Subtracting Functions DOK: DOK 2
2. ANS: D PTS: 1 DIF: L3 REF: 6-6 Function Operations
   OBJ: 6-6.1 To add, subtract, multiply, and divide functions STA: MA.912.A.2.7| MA.912.A.2.8
   TOP: 6-6 Problem 1 Adding and Subtracting Functions DOK: DOK 2
3. ANS: B PTS: 1 DIF: L3 REF: 6-6 Function Operations
   OBJ: 6-6.1 To add, subtract, multiply, and divide functions STA: MA.912.A.2.7| MA.912.A.2.8
   TOP: 6-6 Problem 1 Adding and Subtracting Functions DOK: DOK 2
4. ANS: C PTS: 1 DIF: L3 REF: 6-6 Function Operations
   OBJ: 6-6.1 To add, subtract, multiply, and divide functions STA: MA.912.A.2.7| MA.912.A.2.8
   TOP: 6-6 Problem 2 Multiplying and Dividing Functions DOK: DOK 2
5. ANS: B PTS: 1 DIF: L3 REF: 6-6 Function Operations
   OBJ: 6-6.1 To add, subtract, multiply, and divide functions STA: MA.912.A.2.7| MA.912.A.2.8
   TOP: 6-6 Problem 2 Multiplying and Dividing Functions DOK: DOK 2
6. ANS: D PTS: 1 DIF: L3 REF: 6-6 Function Operations
   OBJ: 6-6.1 To add, subtract, multiply, and divide functions STA: MA.912.A.2.7| MA.912.A.2.8
   TOP: 6-6 Problem 2 Multiplying and Dividing Functions DOK: DOK 2
7. ANS: B PTS: 1 DIF: L3 REF: 6-6 Function Operations
   OBJ: 6-6.2 To find the composite of two functions STA: MA.912.A.2.7| MA.912.A.2.8
   TOP: 6-6 Problem 3 Composing Functions KEY: composite function
   DOK: DOK 2
8. ANS: D PTS: 1 DIF: L4 REF: 6-6 Function Operations
   OBJ: 6-6.2 To find the composite of two functions STA: MA.912.A.2.7| MA.912.A.2.8
   TOP: 6-6 Problem 3 Composing Functions KEY: composite function
   DOK: DOK 2
9. ANS: A PTS: 1 DIF: L3 REF: 6-6 Function Operations
   OBJ: 6-6.2 To find the composite of two functions STA: MA.912.A.2.7| MA.912.A.2.8
   TOP: 6-6 Problem 3 Composing Functions KEY: composite function
   DOK: DOK 2
10. ANS: C PTS: 1 DIF: L3 REF: 6-6 Function Operations
    OBJ: 6-6.2 To find the composite of two functions STA: MA.912.A.2.7| MA.912.A.2.8
    TOP: 6-6 Problem 4 Using Composite Functions KEY: composite function
    DOK: DOK 2
11. ANS: C PTS: 1 DIF: L3 REF: 6-6 Function Operations
    OBJ: 6-6.2 To find the composite of two functions STA: MA.912.A.2.7| MA.912.A.2.8
    TOP: 6-6 Problem 4 Using Composite Functions KEY: composite function
    DOK: DOK 2

12. ANS: C PTS: 1 DIF: L2 REF: 6-7 Inverse Relations and Functions
OBJ: 6-7.1 To find the inverse of a relation or function STA: MA.912.A.2.11
TOP: 6-7 Problem 1 Finding the Inverse of a relation KEY: inverse relation
DOK: DOK 1

13. ANS: D PTS: 1 DIF: L2 REF: 6-7 Inverse Relations and Functions
OBJ: 6-7.1 To find the inverse of a relation or function STA: MA.912.A.2.11
TOP: 6-7 Problem 1 Finding the Inverse of a relation KEY: inverse relation
DOK: DOK 1

14. ANS: A PTS: 1 DIF: L3 REF: 6-7 Inverse Relations and Functions
OBJ: 6-7.1 To find the inverse of a relation or function STA: MA.912.A.2.11
TOP: 6-7 Problem 2 Finding an Equation for the Inverse KEY: inverse relation
DOK: DOK 2

15. ANS: D PTS: 1 DIF: L3 REF: 6-7 Inverse Relations and Functions
OBJ: 6-7.1 To find the inverse of a relation or function STA: MA.912.A.2.11
TOP: 6-7 Problem 2 Finding an Equation for the Inverse KEY: inverse relation
DOK: DOK 2

16. ANS: B PTS: 1 DIF: L3 REF: 6-7 Inverse Relations and Functions
OBJ: 6-7.1 To find the inverse of a relation or function STA: MA.912.A.2.11
TOP: 6-7 Problem 3 Graphing a Relation and Its Inverse KEY: inverse relation
DOK: DOK 2

17. ANS: A PTS: 1 DIF: L2 REF: 6-7 Inverse Relations and Functions
OBJ: 6-7.1 To find the inverse of a relation or function STA: MA.912.A.2.11
TOP: 6-7 Problem 3 Graphing a Relation and Its Inverse KEY: inverse relation
DOK: DOK 2

18. ANS: B PTS: 1 DIF: L3 REF: 6-7 Inverse Relations and Functions
OBJ: 6-7.1 To find the inverse of a relation or function STA: MA.912.A.2.11
TOP: 6-7 Problem 4 Finding an Inverse Function KEY: inverse function
DOK: DOK 2

19. ANS: D PTS: 1 DIF: L2 REF: 6-7 Inverse Relations and Functions
OBJ: 6-7.1 To find the inverse of a relation or function STA: MA.912.A.2.11
TOP: 6-7 Problem 4 Finding an Inverse Function KEY: inverse function
DOK: DOK 2

20. ANS: C PTS: 1 DIF: L3 REF: 6-7 Inverse Relations and Functions
OBJ: 6-7.1 To find the inverse of a relation or function STA: MA.912.A.2.11
TOP: 6-7 Problem 5 Finding the Inverse of a Formula KEY: inverse function
DOK: DOK 3

21. ANS: A PTS: 1 DIF: L4 REF: 6-7 Inverse Relations and Functions
OBJ: 6-7.1 To find the inverse of a relation or function STA: MA.912.A.2.11
TOP: 6-7 Problem 5 Finding the Inverse of a Formula KEY: inverse function
DOK: DOK 3

22. ANS: B PTS: 1 DIF: L2 REF: 6-7 Inverse Relations and Functions
OBJ: 6-7.1 To find the inverse of a relation or function STA: MA.912.A.2.11
TOP: 6-7 Problem 6 Composing Inverse Functions
KEY: composition of functions | inverse relations and functions
DOK: DOK 2

23. ANS: C PTS: 1 DIF: L3 REF: 6-7 Inverse Relations and Functions
OBJ: 6-7.1 To find the inverse of a relation or function STA: MA.912.A.2.11
TOP: 6-7 Problem 6 Composing Inverse Functions
KEY: composition of functions | inverse relations and functions
DOK: DOK 2

24. ANS: C PTS: 1 DIF: L3 REF: 9-1 Mathematical Patterns
OBJ: 9-1.1 To identify mathematical patterns found in a sequence
TOP: 9-1 Problem 1 Generating a Sequence Using an Explicit Formula
KEY: sequence DOK: DOK 1

25. ANS: C PTS: 1 DIF: L3 REF: 9-1 Mathematical Patterns
OBJ: 9-1.1 To identify mathematical patterns found in a sequence
TOP: 9-1 Problem 1 Generating a Sequence Using an Explicit Formula
KEY: sequence DOK: DOK 1

26. ANS: C PTS: 1 DIF: L2 REF: 9-1 Mathematical Patterns
OBJ: 9-1.1 To identify mathematical patterns found in a sequence
TOP: 9-1 Problem 1 Generating a Sequence Using an Explicit Formula
KEY: sequence DOK: DOK 1

27. ANS: A PTS: 1 DIF: L2 REF: 9-1 Mathematical Patterns
OBJ: 9-1.1 To identify mathematical patterns found in a sequence
TOP: 9-1 Problem 2 Writing a Recursive Definition for a Sequence
KEY: sequence | recursive formula DOK: DOK 2

28. ANS: B PTS: 1 DIF: L4 REF: 9-1 Mathematical Patterns
OBJ: 9-1.1 To identify mathematical patterns found in a sequence
TOP: 9-1 Problem 2 Writing a Recursive Definition for a Sequence
KEY: sequence | recursive formula DOK: DOK 2

29. ANS: A PTS: 1 DIF: L4 REF: 9-1 Mathematical Patterns
OBJ: 9-1.1 To identify mathematical patterns found in a sequence
TOP: 9-1 Problem 2 Writing a Recursive Definition for a Sequence
KEY: sequence | recursive formula DOK: DOK 2

30. ANS: D PTS: 1 DIF: L3 REF: 9-1 Mathematical Patterns
OBJ: 9-1.2 To use a formula to find the nth term of a sequence
TOP: 9-1 Problem 3 Writing an Explicit Formula for a Sequence
KEY: sequence | explicit formula DOK: DOK 2

31. ANS: C PTS: 1 DIF: L4 REF: 9-1 Mathematical Patterns
OBJ: 9-1.2 To use a formula to find the nth term of a sequence
TOP: 9-1 Problem 3 Writing an Explicit Formula for a Sequence
KEY: sequence | explicit formula DOK: DOK 2

32. ANS: B PTS: 1 DIF: L3 REF: 9-1 Mathematical Patterns
OBJ: 9-1.2 To use a formula to find the nth term of a sequence
TOP: 9-1 Problem 4 Using Formulas to Find Terms of a Sequence
KEY: sequence DOK: DOK 2

33. ANS: B PTS: 1 DIF: L3 REF: 9-1 Mathematical Patterns
OBJ: 9-1.2 To use a formula to find the nth term of a sequence
TOP: 9-1 Problem 4 Using Formulas to Find Terms of a Sequence
KEY: sequence DOK: DOK 2

34. ANS: A PTS: 1 DIF: L2 REF: 9-1 Mathematical Patterns
OBJ: 9-1.2 To use a formula to find the nth term of a sequence
TOP: 9-1 Problem 4 Using Formulas to Find Terms of a Sequence
KEY: sequence DOK: DOK 2

35. ANS: A PTS: 1 DIF: L2 REF: 9-2 Arithmetic Sequences
OBJ: 9-2.1 To define, identify, and apply arithmetic sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-2 Problem 1 Identifying Arithmetic Sequences KEY: arithmetic sequence
DOK: DOK 2

36. ANS: D PTS: 1 DIF: L2 REF: 9-2 Arithmetic Sequences
OBJ: 9-2.1 To define, identify, and apply arithmetic sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-2 Problem 1 Identifying Arithmetic Sequences KEY: arithmetic sequence
DOK: DOK 2

37. ANS: B PTS: 1 DIF: L3 REF: 9-2 Arithmetic Sequences
OBJ: 9-2.1 To define, identify, and apply arithmetic sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-2 Problem 1 Identifying Arithmetic Sequences KEY: arithmetic sequence
DOK: DOK 2

38. ANS: C PTS: 1 DIF: L3 REF: 9-2 Arithmetic Sequences
OBJ: 9-2.1 To define, identify, and apply arithmetic sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-2 Problem 2 Analyzing Arithmetic Sequences KEY: arithmetic sequence
DOK: DOK 2

39. ANS: A PTS: 1 DIF: L3 REF: 9-2 Arithmetic Sequences
OBJ: 9-2.1 To define, identify, and apply arithmetic sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-2 Problem 2 Analyzing Arithmetic Sequences KEY: arithmetic sequence
DOK: DOK 2

40. ANS: D PTS: 1 DIF: L3 REF: 9-2 Arithmetic Sequences
OBJ: 9-2.1 To define, identify, and apply arithmetic sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-2 Problem 2 Analyzing Arithmetic Sequences KEY: arithmetic sequence
DOK: DOK 2

41. ANS: C PTS: 1 DIF: L2 REF: 9-2 Arithmetic Sequences
OBJ: 9-2.1 To define, identify, and apply arithmetic sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-2 Problem 3 Using the Arithmetic Mean
KEY: arithmetic sequence | arithmetic mean DOK: DOK 2

42. ANS: B PTS: 1 DIF: L3 REF: 9-2 Arithmetic Sequences
OBJ: 9-2.1 To define, identify, and apply arithmetic sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-2 Problem 3 Using the Arithmetic Mean
KEY: arithmetic mean | arithmetic sequence DOK: DOK 2

43. ANS: A PTS: 1 DIF: L2 REF: 9-2 Arithmetic Sequences
OBJ: 9-2.1 To define, identify, and apply arithmetic sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-2 Problem 4 Using an Explicit Formula for an Arithmetic Sequence
KEY: arithmetic sequence DOK: DOK 3

44. ANS: C PTS: 1 DIF: L3 REF: 9-2 Arithmetic Sequences
OBJ: 9-2.1 To define, identify, and apply arithmetic sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-2 Problem 4 Using an Explicit Formula for an Arithmetic Sequence
KEY: arithmetic sequence DOK: DOK 3

45. ANS: A PTS: 1 DIF: L2 REF: 9-3 Geometric Sequences
OBJ: 9-3.1 To define, identify, and apply geometric sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-3 Problem 1 Identifying Geometric Sequences KEY: geometric sequence
DOK: DOK 2

46. ANS: D PTS: 1 DIF: L3 REF: 9-3 Geometric Sequences
OBJ: 9-3.1 To define, identify, and apply geometric sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-3 Problem 1 Identifying Geometric Sequences KEY: geometric sequence
DOK: DOK 2

47. ANS: A PTS: 1 DIF: L3 REF: 9-3 Geometric Sequences
OBJ: 9-3.1 To define, identify, and apply geometric sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-3 Problem 1 Identifying Geometric Sequences KEY: geometric sequence
DOK: DOK 2

48. ANS: C PTS: 1 DIF: L2 REF: 9-3 Geometric Sequences
OBJ: 9-3.1 To define, identify, and apply geometric sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-3 Problem 2 Analyzing Geometric Sequences KEY: geometric sequence
DOK: DOK 2

49. ANS: D PTS: 1 DIF: L3 REF: 9-3 Geometric Sequences
OBJ: 9-3.1 To define, identify, and apply geometric sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-3 Problem 2 Analyzing Geometric Sequences KEY: geometric sequence
DOK: DOK 2

50. ANS: B PTS: 1 DIF: L4 REF: 9-3 Geometric Sequences
OBJ: 9-3.1 To define, identify, and apply geometric sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-3 Problem 2 Analyzing Geometric Sequences KEY: geometric sequence
DOK: DOK 2

51. ANS: A PTS: 1 DIF: L3 REF: 9-3 Geometric Sequences
OBJ: 9-3.1 To define, identify, and apply geometric sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-3 Problem 3 Using a Geometric Sequence KEY: geometric sequence
DOK: DOK 3

52. ANS: A PTS: 1 DIF: L3 REF: 9-3 Geometric Sequences
OBJ: 9-3.1 To define, identify, and apply geometric sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-3 Problem 3 Using a Geometric Sequence KEY: geometric sequence
DOK: DOK 3

53. ANS: B PTS: 1 DIF: L2 REF: 9-3 Geometric Sequences
OBJ: 9-3.1 To define, identify, and apply geometric sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-3 Problem 4 Using a Geometric Mean
KEY: geometric sequence | geometric mean DOK: DOK 2

54. ANS: C PTS: 1 DIF: L3 REF: 9-3 Geometric Sequences
OBJ: 9-3.1 To define, identify, and apply geometric sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-3 Problem 4 Using a Geometric Mean
KEY: geometric sequence | geometric mean DOK: DOK 2

55. ANS: B PTS: 1 DIF: L4 REF: 9-3 Geometric Sequences
OBJ: 9-3.1 To define, identify, and apply geometric sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-3 Problem 4 Using a Geometric Mean
KEY: geometric sequence | geometric mean DOK: DOK 2

56. ANS: B PTS: 1 DIF: L2 REF: 9-4 Arithmetic Series
OBJ: 9-4.1 To define arithmetic series and find their sums
STA: MA.912.D.11.1| MA.912.D.11.2| MA.912.D.11.4
TOP: 9-4 Problem 1 Finding the Sum of a Finite Arithmetic Series
KEY: finite series | series DOK: DOK 2

57. ANS: B PTS: 1 DIF: L3 REF: 9-4 Arithmetic Series
OBJ: 9-4.1 To define arithmetic series and find their sums
STA: MA.912.D.11.1| MA.912.D.11.2| MA.912.D.11.4
TOP: 9-4 Problem 1 Finding the Sum of a Finite Arithmetic Series
KEY: series | finite series DOK: DOK 2

58. ANS: C PTS: 1 DIF: L2 REF: 9-4 Arithmetic Series
OBJ: 9-4.1 To define arithmetic series and find their sums
STA: MA.912.D.11.1| MA.912.D.11.2| MA.912.D.11.4
TOP: 9-4 Problem 1 Finding the Sum of a Finite Arithmetic Series
KEY: series | finite series DOK: DOK 2

59. ANS: C PTS: 1 DIF: L3 REF: 9-4 Arithmetic Series
OBJ: 9-4.1 To define arithmetic series and find their sums
STA: MA.912.D.11.1| MA.912.D.11.2| MA.912.D.11.4
TOP: 9-4 Problem 1 Finding the Sum of a Finite Arithmetic Series
KEY: series | finite series DOK: DOK 2

60. ANS: B PTS: 1 DIF: L3 REF: 9-4 Arithmetic Series
OBJ: 9-4.1 To define arithmetic series and find their sums
STA: MA.912.D.11.1| MA.912.D.11.2| MA.912.D.11.4
TOP: 9-4 Problem 2 Using the Sum of a Finite Arithmetic Series
KEY: series | finite series DOK: DOK 3

61. ANS: C PTS: 1 DIF: L3 REF: 9-4 Arithmetic Series
OBJ: 9-4.1 To define arithmetic series and find their sums
STA: MA.912.D.11.1| MA.912.D.11.2| MA.912.D.11.4
TOP: 9-4 Problem 3 Writing a Series in Summation Notation KEY: series | finite series
DOK: DOK 2

62. ANS: A PTS: 1 DIF: L2 REF: 9-4 Arithmetic Series
OBJ: 9-4.1 To define arithmetic series and find their sums
STA: MA.912.D.11.1| MA.912.D.11.2| MA.912.D.11.4
TOP: 9-4 Problem 3 Writing a Series in Summation Notation KEY: series | finite series
DOK: DOK 2

63. ANS: A PTS: 1 DIF: L3 REF: 9-4 Arithmetic Series
OBJ: 9-4.1 To define arithmetic series and find their sums
STA: MA.912.D.11.1| MA.912.D.11.2| MA.912.D.11.4
TOP: 9-4 Problem 3 Writing a Series in Summation Notation KEY: series | finite series
DOK: DOK 2

64. ANS: A PTS: 1 DIF: L3 REF: 9-4 Arithmetic Series
OBJ: 9-4.1 To define arithmetic series and find their sums
STA: MA.912.D.11.1| MA.912.D.11.2| MA.912.D.11.4
TOP: 9-4 Problem 4 Finding the Sum of a Series KEY: series | finite series
DOK: DOK 2

65. ANS: D PTS: 1 DIF: L3 REF: 9-4 Arithmetic Series
OBJ: 9-4.1 To define arithmetic series and find their sums
STA: MA.912.D.11.1| MA.912.D.11.2| MA.912.D.11.4
TOP: 9-4 Problem 4 Finding the Sum of a Series KEY: series | finite series
DOK: DOK 2

66. ANS: A PTS: 1 DIF: L2 REF: 9-4 Arithmetic Series
OBJ: 9-4.1 To define arithmetic series and find their sums
STA: MA.912.D.11.1| MA.912.D.11.2| MA.912.D.11.4
TOP: 9-4 Problem 5 Using a Graphing Calculator to Find the Sum of a Series
KEY: series | finite series

67. ANS: A PTS: 1 DIF: L3 REF: 9-4 Arithmetic Series
OBJ: 9-4.1 To define arithmetic series and find their sums
STA: MA.912.D.11.1| MA.912.D.11.2| MA.912.D.11.4
TOP: 9-4 Problem 5 Using a Graphing Calculator to Find the Sum of a Series
KEY: series | finite series

68. ANS: A PTS: 1 DIF: L4 REF: 9-5 Geometric Series
OBJ: 9-5.1 To define geometric series and find their sums STA: MA.912.D.11.2| MA.912.D.11.4
TOP: 9-5 Problem 1 Finding the Sums of Finite Geometric Series
KEY: geometric series DOK: DOK 2

69. ANS: A PTS: 1 DIF: L4 REF: 9-5 Geometric Series
OBJ: 9-5.1 To define geometric series and find their sums STA: MA.912.D.11.2| MA.912.D.11.4
TOP: 9-5 Problem 1 Finding the Sums of Finite Geometric Series
KEY: geometric series DOK: DOK 2

70. ANS: C PTS: 1 DIF: L3 REF: 9-5 Geometric Series
OBJ: 9-5.1 To define geometric series and find their sums STA: MA.912.D.11.2| MA.912.D.11.4
TOP: 9-5 Problem 1 Finding the Sums of Finite Geometric Series
KEY: geometric series DOK: DOK 2

71. ANS: C PTS: 1 DIF: L2 REF: 9-5 Geometric Series
OBJ: 9-5.1 To define geometric series and find their sums STA: MA.912.D.11.2| MA.912.D.11.4
TOP: 9-5 Problem 1 Finding the Sums of Finite Geometric Series
KEY: geometric series DOK: DOK 2

72. ANS: C PTS: 1 DIF: L3 REF: 9-5 Geometric Series
OBJ: 9-5.1 To define geometric series and find their sums STA: MA.912.D.11.2| MA.912.D.11.4
TOP: 9-5 Problem 1 Finding the Sums of Finite Geometric Series
KEY: geometric series DOK: DOK 2

73. ANS: A PTS: 1 DIF: L3 REF: 9-5 Geometric Series
OBJ: 9-5.1 To define geometric series and find their sums STA: MA.912.D.11.2| MA.912.D.11.4
TOP: 9-5 Problem 1 Finding the Sums of Finite Geometric Series
KEY: geometric series DOK: DOK 2

74. ANS: A PTS: 1 DIF: L2 REF: 9-5 Geometric Series
OBJ: 9-5.1 To define geometric series and find their sums STA: MA.912.D.11.2| MA.912.D.11.4
TOP: 9-5 Problem 2 Using the Geometric Series Formula KEY: geometric series
DOK: DOK 3

75. ANS: B PTS: 1 DIF: L3 REF: 9-5 Geometric Series
OBJ: 9-5.1 To define geometric series and find their sums STA: MA.912.D.11.2| MA.912.D.11.4
TOP: 9-5 Problem 2 Using the Geometric Series Formula KEY: geometric series
DOK: DOK 3

76. ANS: D PTS: 1 DIF: L3 REF: 9-5 Geometric Series
OBJ: 9-5.1 To define geometric series and find their sums STA: MA.912.D.11.2| MA.912.D.11.4
TOP: 9-5 Problem 2 Using the Geometric Series Formula KEY: geometric series
DOK: DOK 3

77. ANS: C PTS: 1 DIF: L3 REF: 9-5 Geometric Series
OBJ: 9-5.1 To define geometric series and find their sums STA: MA.912.D.11.2| MA.912.D.11.4
TOP: 9-5 Problem 3 Analyzing Infinite Geometric Series KEY: geometric series | converge | diverge
DOK: DOK 2

78. ANS: C PTS: 1 DIF: L2 REF: 9-5 Geometric Series
OBJ: 9-5.1 To define geometric series and find their sums STA: MA.912.D.11.2| MA.912.D.11.4
TOP: 9-5 Problem 3 Analyzing Infinite Geometric Series KEY: geometric series | converge | diverge
DOK: DOK 2

SHORT ANSWER

79. ANS:

a. $-4 + \left(-\frac{4}{3}\right) + \left(-\frac{4}{9}\right) + \left(-\frac{4}{27}\right)$

b. converge

c. –6

PTS: 1 DIF: L4 REF: 9-5 Geometric Series
OBJ: 9-5.1 To define geometric series and find their sums STA: MA.912.D.11.2| MA.912.D.11.4
TOP: 9-5 Problem 3 Analyzing Infinite Geometric Series KEY: geometric series | converge | diverge
DOK: DOK 2

ESSAY

80. ANS:

[4] To find the number of sit-ups on Day 12, first write an explicit formula for the sequence using the explicit formula $a_n = a_1 + (n - 1)d$. You can see that the first term, a_1, is 17 and the common difference is 4. Substitute these values into the formula: $a_n = 17 + (n - 1)4$. Next, substitute 12 into the formula for n and solve for a_n. $a_{12} = 17 + (12 - 1)4$. Simplify to find that $a_n = 61$. She will do 61 sit-ups on Day 12.

[3] correct procedure with one minor mathematical error

[2] correct procedure with two minor mathematical errors

[1] incomplete procedure or correct answer with no explanation or work shown

PTS: 1 DIF: L3 REF: 9-2 Arithmetic Sequences
OBJ: 9-2.1 To define, identify, and apply arithmetic sequences STA: MA.912.D.11.1| MA.912.D.11.3
TOP: 9-2 Problem 4 Using an Explicit Formula for an Arithmetic Sequence
KEY: arithmetic sequence DOK: DOK 3

81. ANS:

[4] **a.** The series written in summation notation is $\sum_{n=1}^{18}(7n-4)$. The lower limit is 1 for the first row and the number 18 is the upper limit for the 18th row. The expression $7n - 4$ can be found by using the expression $a_1 + (n-1)d$. In this case, a_1 is 3 and d is 7. Substituting the values into the expression and simplifying results in $7n - 4$.

b. To find the total number of beads, use the formula $S_n = \frac{n}{2}(a_1 + a_n)$. In this case, n is 18 and a_n is $7(18) - 4$ or 122. Substitute into the formula: $S_n = \frac{18}{2}(3 + 122)$, or 1125. There are 1125 beads in the necklace.

[3] correct procedures used with one minor mathematical error
[2] correct procedures used with two minor mathematical errors
[1] incomplete procedures or correct answer with no explanation or work shown

PTS: 1 DIF: L4 REF: 9-4 Arithmetic Series
OBJ: 9-4.1 To define arithmetic series and find their sums
STA: MA.912.D.11.1| MA.912.D.11.2| MA.912.D.11.4
TOP: 9-4 Problem 2 Using the Sum of a Finite Arithmetic Series
KEY: series | finite series DOK: DOK 3