1st semester exam review algebra 2 cp

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

1. Find the next term of the arithmetic sequence.
   8, –9, –26, –43...
   a. –60       c. –57
   b. –53       d. 731

2. Match the equation with its graph.
   \[-7x + 7y = -49\]
   a.
   b.
   c.
   d.

3. You had $199, but you are spending $3 each day. What algebraic expression models this situation?
   a. 199 – 3d       c. 196d
   b. 199 + 3d       d. 3 + 199d
4. Nina wants to download games for her video game console. Older games cost 250 points and new releases cost 500 points. Nina has 7500 points to use. The equation $250a + 500b = 7500$, where $a$ is the number of older games and $b$ is the number of new releases, models the situation. How many older games can she download if she downloads five new games?
   a. 20  
   b. 12  
   c. 17  
   d. 40

What is an equation of the line in slope intercept form?

5. 
   a. $y = 5x + 4$  
   b. $y = -5x + 4$  
   c. $y = 4x - 5$  
   d. $y = 4x + 5$

Write the equation in slope-intercept form. What are the slope and $y$-intercept?

6. $-8x + 3y = -10$
   a. $y = \frac{8}{3}x + \frac{10}{3}$;  
      slope: $\frac{10}{3}$; $y$-intercept: $\frac{8}{3}$  
   b. $y = \frac{8}{3}x - \frac{10}{3}$;  
      slope: $\frac{8}{3}$; $y$-intercept: $-\frac{10}{3}$
   c. $y = \frac{8}{3}x - \frac{10}{3}$;  
      slope: $\frac{8}{3}$; $y$-intercept: $\frac{10}{3}$  
   d. $y = \frac{8}{3}x + \frac{10}{3}$;  
      slope: $\frac{8}{3}$; $y$-intercept: $\frac{10}{3}$

Short Answer

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

7. 13, 20, 27, 34, ...
8. After a gas-filled balloon is released, it rises to 90 feet in the first minute. In the second minute, the balloon rises to 120 feet, and in the third minute, it rises to 150 feet. How many feet would the balloon rise in 8 minutes?

What is the sum of the finite arithmetic series?

9. $29 + 32 + 35 + 38 + 41 + \ldots + 59$

What is the fifth term of the geometric sequence?

10. 5, 15, 45, ...

Find $S_n$ for the given geometric series. Round answers to the nearest hundredth, if necessary.

11. $a_1 = 0.28$, $a_5 = 362.88$, $r = 6$

12. Find the 50th term of the sequence 5, −2, −9, −16, ...

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

13. 6, 12, 24, 48, ...

Find $S_n$ for the given arithmetic series.

14. $a_1 = 20$, $d = -6$, $n = 16$

15. Nadir saves $1 the first day of a month, $2 the second day, $4 the third day, and so on. He continues to double his savings each day. Find the amount that he will save on the fifteenth day.

16. Evaluate the series 6 − 24 + 96 − 384 + ... to $S_7$.

Solve the equation for the given variable.

17. $V = lwh$; $w$

Graph the equation.

18. $x = -4$

Graph the inequality.

19. $4x + 6y \geq 10$

Solve the system of linear inequalities by graphing.

20. $y \leq x + 4$
    $2x + y \leq -4$
21. \[
\begin{align*}
x & \geq -2 \\
y & > 3
\end{align*}
\]

22. Given the system of constraints, name all vertices. Then find the maximum value of the given objective function.
\[
\begin{align*}
x & \geq 0 \\
y & \geq 0 \\
6x - 2y & \leq 12 \\
4y & \leq 4x + 8
\end{align*}
\]
Maximum for \( C = 4x - 3y \)

**Simplify the expression.**

23. \((-2.7)^0\)

24. \(-(6)^{-1}\)

25. \(a^5 \cdot 3b^9 \cdot 6a\)

26. \((5k^3)^3\)

27. \((-5g^5h^6)^2(g^4h^2)^4\)

28. \(\frac{m^{-6}n^{-3}}{m^{-13}n^{-1}}\)

29. \(\left(\frac{3x}{2}\right)^4\)

**Simplify the difference.**

30. \((4w^2 - 4w - 8) - (2w^2 + 3w - 6)\)

31. Simplify the sum.
\((4u^3 + 4u^2 + 2) + (6u^3 - 2u + 8)\)

**Factor the polynomial.**

32. \(24w^{12} + 64w^8\)

**Simplify the product using FOIL.**

33. \((4x + 3)(2x + 5)\)
Find the square.

34. \((8m + 7)^2\)

Find the product.

35. \((4m^2 - 5)(4m^2 + 5)\)

To which set of numbers does the number belong?

36. \(\sqrt{51}\)

37. \(-55\)

Name the property of real numbers illustrated by the equation.

38. \(-2(x + 11) = -2x - 22\)

39. \(2 \cdot \left(\sqrt{8} \cdot 7\right) = \left(2 \cdot \sqrt{8}\right) \cdot 7\)

Evaluate the expression for the given value of the variable(s).

40. \(\frac{4(3h - 6)}{1 + h}; h = -2\)

Combine like terms. What is a simpler form of each expression?

41. \(4c - 4d + 8c - 3d\)

Solve the equation or formula for the indicated variable.

42. \(T = \frac{4U}{E}, \text{ for } U\)

What is the solution of the equation?

43. \(-6p + 7 = 3(2p - 3) - 4(-10 + 4p)\)
Find the slope of the line.

44. 

45. Find the slope of the line containing the points \((-1, -6)\) and \((2, 3)\).

Simplify the expression using only positive exponents.

46. \((-3u^2r^6t^4)^3\)

What is the simplified form of each expression?

47. \(13 \left[ 6^2 \div \left( 5^3 - 4^2 \right) + 9 \right] \)

Solve the system by graphing.

48. \[
\begin{align*}
-3x - y &= -10 \\
4x - 4y &= 8
\end{align*}
\]

Solve the system by substitution.

49. \[
\begin{align*}
-2x - y &= -14 \\
3x - y &= 11
\end{align*}
\]

Solve the system using elimination.

50. \[
\begin{align*}
7x + 2y &= 11 \\
4x - 7y &= -10
\end{align*}
\]
What are the solutions of the following systems?

51. \[
\begin{align*}
-x + 2y &= 10 \\
-3x + 6y &= 11
\end{align*}
\]

Graph the system of constraints and find the value of \( x \) and \( y \) that maximize the objective function.

52. Constraints

\[
\begin{align*}
x &\geq 0 \\
y &\geq 0 \\
y &\leq \frac{1}{3} x + 3 \\
5 &\leq y + x
\end{align*}
\]

Objective function: \( C = 6x - 3y \)

Simplify the product.

53. \( 5a^2(3a^4 + 3b + 2) \)

Factor the polynomial.

54. \( 2x^3 + 4x^2 + 8x \)

What is the factored form of the expression?

55. \( 15g^3 + 20g^2 - 18g - 24 \)
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Answer Section

MULTIPLE CHOICE

1. A
2. A
3. A
4. A
5. D
6. B

SHORT ANSWER

7. yes, 7
8. 300 ft
9. 484
10. 405
11. 435.4
12. –338
13. yes, 2
14. –400
15. $16,384
16. 19,662
17. \( w = \frac{V}{lh} \)
18. [Diagram]
19. (0, 2), (2, 0), (4, 6); maximum value of 8

20. 

21. 

22. (0, 2), (2, 0), (4, 6); maximum value of 8

23. 1

24. $\frac{1}{6}$
25. \(18a^6b^9\)
26. \(125k^6\)
27. \(25g^{26}h^{20}\)
28. \(\frac{m^7}{n^2}\)
29. \(\frac{81x^4}{16}\)
30. \(2w^2 - 7w - 2\)
31. \(10u^3 + 4u^2 - 2u + 10\)
32. \(8w^6(3w^4 + 8)\)
33. \(8x^2 + 26x + 15\)
34. \(64m^2 + 112m + 49\)
35. \(16m^4 - 25\)
36. irrational numbers
37. integers
38. Distributive Property
39. Associative Property of Multiplication
40. 48
41. \(12c - 7d\)
42. \(U = \frac{TE}{4}\)
43. \(p = 6\)
44. \(-2\)
45. 3
46. \(-27u^6r^{18}t^{12}\)
47. 169
48. 
(3, 1)
49. (5, 4)
50. (1, 2)
51. no solutions
52. (5,0)
53. $15a^b + 15a^2b + 10a^2$
54. $2x(x^2 + 2x + 4)$
55. $(5g^2 - 6)(3g + 4)$