

ALGEBRA II CCA PRACTICE EXAM

Choose the letter of the best answer in each problem below.

- Which statement is true of the graph of the equation $x - 4y = 8$?
A. The slope is 4 and y-intercept is 8. B. The slope is $\frac{1}{4}$ and y-intercept is -2.
C. The slope is $-\frac{1}{4}$ and y-intercept is -2. D. The slope is $\frac{1}{4}$ and y-intercept is 2.
E. The slope is -4 and y-intercept is 2.
- $4(4^2 + 1) - 5 \cdot 3^2 =$
A. 23 B. -9 C. 53 D. -11
- The product of a number decreased by six and the same number increased by three is eight. Which equation, if any, can be used to solve this problem?
A. $(x + 6)(x + 3) = 8$ B. $(x - 6) + (x + 3) = 8$ C. $(x - 6)(x + 3) = 8$
D. $(x + 6)(x - 3) = 8$ E. none of these
- Which one of the following statements is true?
A. $(x + 3)(x - 4) = x^2 - 7x - 12$ B. $(2x - 1)(2x + 3) = 4x^2 - 8x - 3$
C. $(2x + 1)(2x - 3) = 4x^2 - 4x - 3$ D. $(x + 8)(x - 1) = x^2 + 7x + 8$
E. $(3x - 1)(4x + 3) = 12x^2 - 5x - 3$
- Evaluate $\begin{vmatrix} 2 & 3 & 1 \\ 0 & 1 & -2 \\ 1 & 2 & 3 \end{vmatrix}$ A. 19 B. 21
C. -2 D. 7
- Simplify $(4a)(3a^2w)(3aw^4) + (4a^2)(aw^3)^2$.
A. $40a^4w^5$ B. $36a^4w^5 + 4a^4w^6$ C. $40a^8w^{11}$ D. none of these

7.
$$\begin{array}{|ccc|} \hline 1 & 4 & -2 \\ 2 & 0 & 2 \\ 1 & -2 & -4 \\ \hline 1 & 1 & -2 \\ 2 & 1 & 2 \\ 1 & -3 & -4 \\ \hline \end{array}$$
 represents the value of which variable in the solution of the following system of equations?
- $$\begin{aligned} x + y - 2z &= 4 \\ 2x + y + 2z &= 0 \\ -3y - 4z &= -2 \end{aligned}$$
- A. x
B. y
C. z
D. none of these

8. Simplify $\frac{x^2(a^{-3}y)^{-2}}{x^5a^3y^{-3}}$
- A. $\frac{1}{x^3a^4y}$ B. $\frac{a^3y^5}{x^3}$ C. $\frac{a^3y}{x^3}$ D. $\frac{x^3}{a^3y}$

For questions 9 and 10, classify the statement as (A) true or (B) false.

9. If $x(x - 5) = 0$, then $x = 0$ or $x = 5$.
10. If $x(x - 5) = 1$, then $x = 1$ or $x = 6$.
11. Find all solutions to $3x^3 + 6x^2 = 9x$.
- A. $\{-1, 3\}$ B. $\{0, -1, 3\}$ C. $\{0, 1, -3\}$ D. $\{3\}$
12. Simplify: $\frac{x^2 + 4x}{x^2 - 6x + 8} \cdot \frac{x^2 - x - 2}{3x^3 + 12x^2}$
- A. $\frac{x^2 + x}{x - 4}$ B. $\frac{x(x - 1)}{x - 4}$ C. $\frac{x + 1}{3x^2 - 12x}$ D. $\frac{x(x + 1)}{(x - 4)(3x^2)}$
13. Simplify: $\frac{x^2 + 9x + 20}{x^2 - 25}$
- $\frac{x + 4}{x - 4}$ A. $\frac{x + 5}{x - 4}$ B. $\frac{x - 4}{x - 5}$
 C. $\frac{(x + 5)}{(x - 5)}$ D. $\frac{9x + 4}{5}$
14. If the graph of $y = |x|$ is shifted up 3 units, left 2 units, reflected over the x-axis, and made wider, which of the following could be the new equation?
- A. $y = 2/5 |x + 2| + 3$ B. $y = -2/3 |x - 2| + 3$ C. $y = -4 |x - 2| + 3$
 D. $y = -3 |x + 2| + 3$ E. $y = -2/5 |x + 2| + 3$

FACTOR COMPLETELY over the Real Numbers in problems 15-16:

15. $x^4 - 16$

A. $(x^2 - 4)(x^2 + 4)$

B. $(x^2 + 8)(x^2 - 8)$

C. $(x^2 + 4)(x - 2)(x + 2)$

D. $(x + 2)^3(x - 2)$

E. none of these

16. $9x^2 + 36y^2$

A. $9(x + 2y)^2$

B. $9(x^2 + 4y^2)$

C. $9(x - 2y)(x + 2y)$

D. $(3x + 6y)(3x - 6y)$

E. none of these

17. Simplify: $\sqrt{12x^2y^3} \cdot \sqrt{24x^2y^4}$

A. $12x^2y^3\sqrt{2y}$

B. $4x^2y^3\sqrt{3y}$

C. $6x^2y^3\sqrt{y}$

D. $12xy^2\sqrt{2y}$

18. Simplify: $(2 + 3i)(5 - i)$.

A. $7 + 13i$

B. 13

C. $13 + i$

D. $13 + 13i$

19. Solve: $4x^2 + 36 = 0$.

A. $\pm 3i$

B. ± 3

C. $\pm 9i$

D. \emptyset

20. Which of the following is equivalent to i^{14} ?

A. i

B. -1

C. $-i$

D. 1

21. Simplify: $\sqrt{-25} \cdot \sqrt{-12}$

A. $10i\sqrt{5}$

B. $5i\sqrt{12}$

C. $10\sqrt{3}$

D. $-10\sqrt{3}$

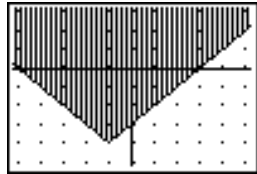
22. Simplify: $3\sqrt{24} - \sqrt{18} - \sqrt{96} + 2\sqrt{50}$

A. $2\sqrt{6} + 7\sqrt{2}$

B. $\sqrt{6} + 4\sqrt{2}$

C. $7\sqrt{2} - 2\sqrt{6}$

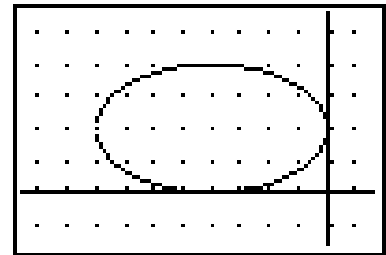
D. $6\sqrt{6} + 14\sqrt{2}$

23. State the value of the discriminant for the equation: $4x^2 + 8x = -3$.
- A. 4 B. -16 C. -4 D. 16
24. Solve: $x^2 = -12x - 4$
- A. $-6 \pm 8\sqrt{2}$ B. $-6 \pm 4\sqrt{10}$ C. $-6 \pm 4\sqrt{2}$ D. $-6 \pm 2\sqrt{10}$
25. Describe the nature of the roots of the equation: $x^2 = 3x - 2$.
- A. imaginary B. 2 real, irrational C. 2 real, rational D. real, equal
26. If the product of two consecutive odd integers is decreased by one-third of the smaller integer, the result is 250. Which equation could be used to find the two integers?
- A. $3x^2 + 5x - 750 = 0$ B. $3x^2 + 2x - 250 = 0$
 C. $3x^2 + 2x - 750 = 0$ D. $3x^2 + 5x - 250 = 0$
27. Which inequality is graphed at the right?
- A. $y \leq |x - 1| - 4$ B. $y \geq |x - 1| - 4$
 C. $y \leq |x + 1| - 4$ D. $y \geq |x + 1| - 4$
- 
28. What is the equation for the axis of symmetry of the parabola with equation $y = -2x^2 + 16x - 31$?
- A. $x = -4$ B. $x = -8$ C. $x = 4$ D. $x = 8$
29. Which is the vertex of the graph of $y = -2x^2 - 12x - 22$?
- A. (-3, -4) B. (3, -4) C. (-3, 4) D. (3, 4)
30. Find the distance between the points (3, -5) and (4, 6).
- A. $5\sqrt{2}$ B. $4\sqrt{3}$ C. $3\sqrt{10}$ D. $\sqrt{122}$
31. Find the radius of the circle with equation $x^2 + y^2 + 4x = 8$.
- A. 8 B. $2\sqrt{2}$ C. $2\sqrt{3}$ D. $2\sqrt{6}$

32. What is the graph of $2y^2 - 4y = -3x^2 - 6x - 1$?
- A. parabola B. ellipse C. hyperbola D. intersecting lines
33. The set of all points P in a plane such that the absolute value of the difference of the distances from P to two fixed points is a constant would be the graph of a _____.
- A. circle B. parabola C. ellipse D. hyperbola
34. Find the foci of the ellipse with equation $x^2 + 4y^2 = 36$.
- A. $(\pm 3\sqrt{3}, 0)$ B. $(0, \pm 3\sqrt{3})$ C. $(\pm 3, 0)$ D. $(0, \pm 3)$
35. Find the vertices of the hyperbola with equation $\frac{(y-4)^2}{25} - \frac{(x-6)^2}{9} = 1$
- A. $(6, 9)$ $(6, -1)$ B. $(9, 4)$ $(3, 4)$ C. $(9, 6)$ $(-1, 6)$ D. $(-6, 9)$ $(-6, -1)$

36. What equation is shown by the graph?

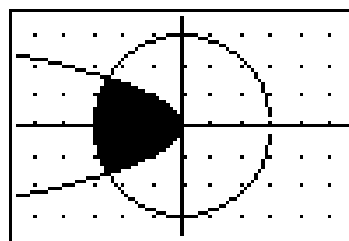
- A. $\frac{(x+4)^2}{16} + \frac{(y-2)^2}{4} = 1$ B. $\frac{(x-4)^2}{16} + \frac{(y-2)^2}{4} = 1$
- C. $\frac{(x+4)^2}{4} - \frac{(y+2)^2}{16} = 1$ D. $\frac{(x-4)^2}{4} - \frac{(y-2)^2}{16} = 1$



37. What is the graph of $9x^2 = y^2$?
- A. parabola B. intersecting lines C. ellipse D. hyperbola

38. What system of inequalities is shown in the graph?

- A. $x^2 + y^2 \leq 9$
 $y^2 + x \geq 0$
- B. $x^2 + y^2 \geq 9$
 $y^2 + x \geq 0$
- C. $x^2 + y^2 \geq 9$
 $y^2 + x \leq 0$
- D. $x^2 + y^2 \leq 9$
 $y^2 + x \leq 0$



39. What is the sum of the x and y coordinates for **all** solutions to this system of equations:
 $y = (x + 1)^2$ and $(x + 1)^2 - \frac{y^2}{4} = 1$.

- A. -2 B. 4 C. -4 D. 2

40. If $p(x) = 3x^3 - 2x^2 + ax + b$, find the value of **a** so that $p(-2) = -37$ and $p(1) = 2$.

- A. -2 B. 2 C. 4 D. -4

41. What is the remainder for $(3x^4 + 8x^2 - 1) \div (x + 1)$?

- A. -10 B. 10 C. 6 D. -6

42. The graph of $x - y^2 = 0$ is symmetric about which of these?

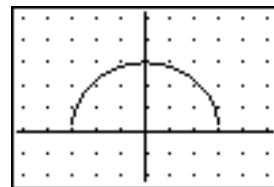
- A. origin B. x - axis C. y - axis D. no symmetry

43. If $f(x) = x + 1$ and $g(x) = x^2 + 5x + 1$, then $g(f(x)) = \underline{\hspace{2cm}}$.

- A. $x^2 + 5x + 2$ B. $x^2 + 7x + 2$ C. $x^2 + 7x + 7$ D. $x^2 + 5x + 7$

44. Identify the range of the function: $y = \sqrt{9 - x^2}$.

- A. $\{y \mid -3 \leq y \leq 3\}$ B. $\{y \mid y \geq 3\}$
 C. $\{y \mid 0 \leq y \leq 3\}$ D. $\{y \mid y \leq -3\}$



45. Two meshed gears have 35 and 56 teeth, respectively. If the speeds are inversely proportional to the numbers of teeth, at what speed should the second gear be driven so that the first gear will run at 1450 rev/min?

- A. 1.351 rev/min B. 2320 rev/min C. 2255.6 rev/min D. 906.25 rev/min

46. Suppose z varies jointly as x and y . If $z = 12$ when $x = 9$ and $y = 4$, find z when $x = 7$ and $y = 2$.

- A. 42 B. $14/3$ C. $56/3$ D. $3/14$

47. What is the value of $\frac{6x^{-1/3}}{3x^0 - 2x^{2/3}}$ when $x = 27$?
- A. $-3/5$ B. $-2/15$ C. $-6/13$ D. 16
48. Find the rational zeros of $f(x) = 2x^3 - 9x^2 + 3x + 4$.
- A. 1, 4, $-1/2$ B. $-1, 4, -1/2$ C. $\pm 4, \pm 2, \pm 1, \pm 1/2$ D. $\pm 1, \pm 4, \pm 1/2$
49. Determine all of the roots of $f(x) = x^3 - 3x^2 + 9x + 13$ if $2 + 3i$ is one root.
- A. $2 + 3i, 2 - 3i, -1$ B. $2 + 3i, 2 - 3i, 1$ C. $2 + 3i, 1, -1$ D. $2 + 3i, 2 - 3i, 1, -1$
50. Solve for x : $9^{2x} = (1/3)^{x-1}$
- A. -2 B. $1/2$ C. $1/5$ D. 5
51. What is the value of x in the equation $\log_3 x = -2$?
- A. \emptyset B. -9 C. $-1/9$ D. $1/9$
52. Evaluate: $2 \log_2 4 - \log_2 8 + \log_2 1/2$
- A. $-4/3$ B. 0 C. -1 D. -4
53. If $\log_x 3 = 0.4777$ and $\log_x 5 = 0.699$, then $\log_x 15 =$
- A. 1.1767 B. 0.3334 C. 2.097 D. 2.385
54. Solve for x : $10^x = 3800$.
- A. 380 B. -2.5798 C. 3.58 D. 2.5798
55. How many arrangements are there of the letters in the word INTERVAL?
- A. 8! B. 6! C. 8^2 D. 8
56. How many distinguishable permutations are there of the letters in the word ALGEBRA?
- A. 10,080 B. 2520 C. 5040 D. 42

57. The baseball team has 2 different pairs of pants, 3 different shirts, and 2 different hats. How many different uniforms can the team wear?
- A. 72 B. 36 C. 7 D. 12

58. A drawer contains 4 red, 5 green, and 6 blue socks. If you choose 2 socks without replacement, what is the probability of choosing one red sock and one green sock?
- A. $4/45$ B. $2/21$ C. $4/21$ D. $9/20$

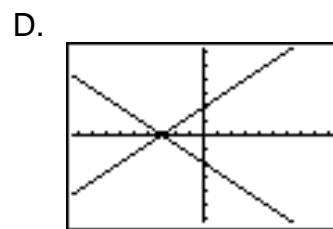
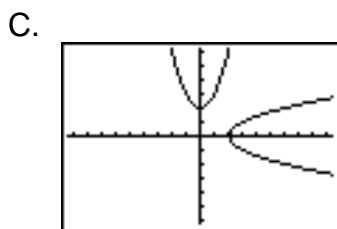
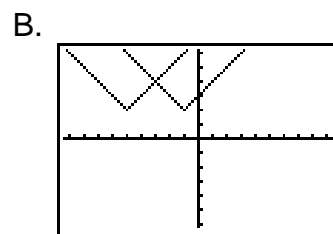
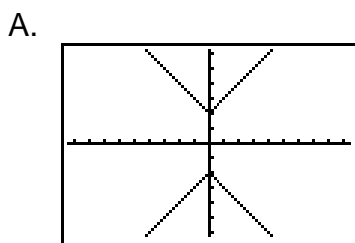
59. How many different committees of 4 students can be formed from a 7th grade class of 20 and an 8th grade class of 23 if the committee must have two 7th-graders and two 8th-graders?
- A. 48,070 B. 443 C. 460 D. 192,280

60. If a scatter-plot of this table is drawn, what would be the equation for the line of best fit?

X	1	2	3	4	5	6	7	8
Y	2	3.6	3.7	5	5.4	7.6	7.7	9

- A. $y = x - .99$ B. $y = .97x + 1.13$ C. $y = 1.13x + .97$ D. $y = .01x + .84$
61. Find the area of the triangle with vertices $(-4, 7)$, $(5, 3)$, and $(-1, 1)$.
- A. - 21 sq. un. B. 42 sq. un. C. - 42 sq. un. D. 21 sq. un.

62. Which of the following shows the graph of a function and its inverse?



63. The 75th term of $-21, -15, -9, \dots$ is
- A. 429 B. 423 C. 471 D. -423
64. Find the geometric means between 4, _____, _____, -500.
- A. 20, -100 B. $-169\frac{1}{3}, 334\frac{2}{3}$ C. -20, 100 D. -164, -332
65. Evaluate $\sum_{n=3}^6 2^n$
- A. 8 B. 56 C. 120 D. 86
66. A ball is dropped from a height of 15 feet. Each time it strikes the ground, it bounces up $\frac{2}{3}$ of the previous height. What total distance does the ball travel before it stops bouncing?
- A. 45 feet B. 75 feet C. 30 feet D. infinite
67. Find the 100th term of the sequence $-20, -16, -12, -8, \dots$
- A. 396 B. 380 C. -416 D. 376

ALGEBRA II HONORS PRACTICE EXAM ANSWER KEY

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|-------|-------|-------|-------|
| 1. B | 18. D | 35. A | 52. B |
| 2. A | 19. A | 36. A | 53. A |
| 3. C | 20. B | 37. B | 54. C |
| 4. C | 21. D | 38. D | 55. A |
| 5. D | 22. A | 39. D | 56. B |
| 6. B | 23. D | 40. B | 57. D |
| 7. B | 24. C | 41. B | 58. C |
| 8. C | 25. C | 42. B | 59. A |
| 9. A | 26. A | 43. C | 60. B |
| 10. B | 27. D | 44. C | 61. D |
| 11. C | 28. C | 45. D | 62. C |
| 12. C | 29. A | 46. B | 63. B |
| 13. B | 30. D | 47. B | 64. C |
| 14. E | 31. C | 48. A | 65. C |
| 15. C | 32. B | 49. A | 66. B |
| 16. B | 33. D | 50. C | 67. D |
| 17. A | 34. A | 51. D | |