

DIVISION I EXAM 2004 -- ALGEBRA I

- If $f(x) = 5 - 2x$ then $f(3) =$
[A] 11 [B] -1 [C] 9 [D] None of the previous
- If $f(x) = 3x + 5$ then $f(2h) =$
[A] $6h + 5$ [B] $6h + 10$ [C] $6xh + 10h$ [D] None of the previous
- Simplify the expression: $-2(2x - 8) + (-2)x$
[A] $-6x - 16$ [B] $-6x + 16$ [C] $-6x - 8$ [D] None of the previous
- Simplify completely: $\frac{-16}{-9} \div \frac{32}{-3}$
[A] $\frac{-512}{27}$ [B] $-\frac{1}{6}$ [C] $\frac{24}{-144}$ [D] None of the previous
- Solve the equation: $\frac{5}{8}x + \frac{1}{3} = 1$
[A] $x = \frac{16}{15}$ [B] $x = -\frac{15}{16}$ [C] $x = -\frac{16}{15}$ [D] None of the previous
- Solve for the variable P in the equation: $E = F + 9FP$
[A] $P = \frac{E - 9F}{F}$ [B] $P = \frac{1}{9} \frac{E - F}{F}$ [C] $P = E - 10F$ [D] None of the previous
- The number 7.44 is what percent of 186?
[A] 0.04% [B] 4% [C] 25% [D] None of the previous
- Find the length of the line segment connecting the ordered pairs $(5, -3)$ and $(2, -6)$.
[A] 18 [B] $\sqrt{130}$ [C] $3\sqrt{2}$ [D] None of the previous
- Find the slope of the line containing the points $(-1, -3)$ and $(-2, -4)$.
[A] $\frac{3}{7}$ [B] 1 [C] $\frac{7}{3}$ [D] None of the previous

10. Simplify: $6 - 3 \left[\frac{2^2 - 1}{3} \right] \div \frac{1}{6}$

[A] $6\frac{1}{2}$

[B] 18

[C] -12

[D] None of the previous

11. Evaluate the determinant: $\begin{vmatrix} 4 & -7 \\ -2 & -3 \end{vmatrix}$

[A] 2

[B] -26

[C] -2

[D] None of the previous

12. Solve the system of equations: $\begin{cases} x + 2y = -8 \\ x + 4y = 1 \end{cases}$

[A] $x = -17, y = \frac{9}{2}$

[B] $x = -\frac{17}{3}, y = -\frac{7}{6}$

[C] $x = -15, y = -\frac{9}{2}$

[D] None of the previous

13. How many solutions does the following system of equations have? $\begin{cases} x + y + z = 3 \\ y - z = -2 \\ -3y + 3z = 6 \end{cases}$

[A] no solutions

[B] one solution

[C] an infinite number of solutions

[D] None of the previous

14. Multiply: $(2x - 3)(2x^2 + 6x + 5)$

[A] $4x^3 + 18x^2 + 28x + 15$

[B] $4x^3 - 18x^2 + 8x + 15$

[C] $4x^3 + 6x^2 - 8x - 15$

[D] None of the previous

15. Factor: $x^2 - 5x - 6$

[A] $(x + 6)(x - 1)$

[B] $(x - 6)(x + 1)$

[C] $(x - 6)(x - 1)$

[D] None of the previous

16. Factor: $8x^3 - 27$

[A] $(2x - 3)^3$

[B] $(2x - 3)(4x^2 - 6x + 9)$

[C] $(2x - 3)(4x^2 + 6x + 9)$

[D] None of the previous

17. What is the sum of the solutions of the equation $x^2 - 6x - 6 = 0$?

[A] 0

[B] 6

[C] -8

[D] None of the previous

18. The lengths of the three sides of a right triangle are given by three consecutive even integers. Find the length of the largest side.

[A] 5

[B] 6

[C] 8

[D] None of the previous

19. Find the domain of $f(x) = \frac{\sqrt{x^2 - 4}}{x - 3}$.

[A] $x \neq 3$

[C] $x \leq -2$, $x \geq 2$

[B] $x \leq -2$ or $x \geq 2$ and $x \neq 3$

[D] None of the previous

20. Simplify: $\frac{x^2 - 9}{x^2 - 16} \div \frac{x - 3}{x + 4}$

[A] $\frac{x - 3}{x + 4}$

[B] $\frac{x + 4}{x - 3}$

[C] $\frac{x + 3}{x - 4}$

[D] None of the previous

21. Simplify: $-\frac{9}{x^2 + 7x - 18} - \frac{4}{x + 9}$

[A] $\frac{1 - 4x}{(x + 9)(x - 2)}$

[B] $\frac{4x + 1}{(x + 9)(x - 2)}$

[C] $-\frac{4x + 1}{(x + 9)(x - 2)}$

[D] None of the previous

22. Solve: $\frac{x}{3} - \frac{x}{4} + \frac{x}{6} = 1$

[A] 12

[B] -12

[C] -4

[D] None of the previous

23. The width of a rectangle is 4 feet longer than its length. The perimeter of the rectangle is 40 feet. What is the length of the rectangle?

[A] 11 feet

[B] 13 feet

[C] 8 feet

[D] None of the previous

24. The sales tax rate on a purchase is 6% and the total cost including purchase price and tax is \$91. Find the purchase price before tax.

[A] \$86.00

[B] \$85.54

[C] \$85.84

[D] None of the previous

25. Solve the inequality: $\frac{-3x}{5} - 7 < 8$

[A] $x > \frac{-47}{3}$

[B] $x > -25$

[C] $x < -25$

[D] None of the previous

26. Find the solution set: $|2x - 3| - 29 = -14$

[A] $\{9, -6\}$

[B] $\{9, -9\}$

[C] $\{9\}$

[D] None of the previous

27. Find the solution set: $|5x - 2| \leq 5$

[A] $\left[-\frac{3}{5}, \frac{7}{5}\right]$

[B] $\left[-\frac{7}{5}, \frac{7}{5}\right]$

[C] $\left[\frac{13}{10}, \frac{3}{20}\right]$

[D] None of the previous

28. Find the slope of the line that is perpendicular to the line that passes through the points $(1, 6)$ and $(18, -17)$.

- [A] $\frac{17}{23}$ [B] $\frac{23}{17}$ [C] $-\frac{23}{17}$ [D] None of the previous

29. Find the slope of the line whose equation is $-14x + 4y = -7$.

- [A] $\frac{7}{2}$ [B] $\frac{2}{7}$ [C] $-\frac{7}{4}$ [D] None of the previous

30. For $f(x) = 2x + 1$, find $f(f(2))$.

- [A] 11 [B] 10 [C] $4x + 2$ [D] None of the previous

31. Simplify: $\frac{(-2ab^2)^5}{(4a^4b)^3}$

- [A] $-\frac{b^7}{2a^7}$ [B] $-\frac{a^7b^7}{2}$ [C] $-\frac{2b^7}{a^7}$ [D] None of the previous

32. Perform the indicated operation: $(4x - 5)(4x + 5)$

- [A] $4x^2 + 25$ [B] $16x^2 + 25$ [C] $16x^2 - 25$ [D] None of the previous

33. Solve: $16x^3 = 25x$

- [A] $\left\{\frac{5}{4}, -\frac{5}{4}\right\}$ [B] $\left\{\frac{25}{16}, -\frac{25}{16}\right\}$ [C] $\left\{\sqrt[3]{\frac{25}{16}}, -\sqrt[3]{\frac{25}{16}}\right\}$ [D] None of the previous

34. Reduce to smallest terms: $\frac{-3x^2 + 5x + 2}{-15x^2 + 40x + 15}$

- [A] $\frac{-3x + 2}{5x + 15}$ [B] $\frac{-3x - 2}{5x - 15}$ [C] $\frac{x - 2}{5x - 15}$ [D] None of the previous

35. Find the domain of the function $f(x) = \frac{4x - 8}{x - 3}$.

- [A] $x \neq 2$ [B] $x \neq 3$
[C] $x \neq 2$ and $x \neq 3$ [D] None of the previous

36. Perform the division: $\frac{-2x^3 + 7x^2 - 3x + 4}{x - 2}$

[A] $-2x^2 - 3x + 3 - \frac{10}{x - 2}$

[B] $-2x^2 + 3x + 3 + \frac{10}{x - 2}$

[C] $x^2 - 3x + 3 + \frac{10}{x - 2}$

[D] None of the previous

37. Perform the multiplication and simplify: $\frac{-9x^{-5}}{-6y^3} \cdot \frac{-7y^9}{-3x^9}$

[A] $\frac{3y^6}{2x^4}$

[B] $\frac{7y^6}{2x^{14}}$

[C] $-\frac{3y^6}{2x^4}$

[D] None of the previous

38. Perform the division and simplify: $\frac{x^2 + 4x + 4}{4x^2 + 6x - 4} \div \frac{x^2 - x - 6}{12x^2 - 14x + 4}$

[A] $\frac{3x + 2}{x - 2}$

[B] $\frac{3x - 2}{x - 3}$

[C] $\frac{(4x - 2)(3x + 2)}{(x - 3)(x - 2)}$

[D] None of the previous

39. Find two consecutive integers, the sum of whose reciprocals is $\frac{9}{20}$.

[A] 2, 4

[B] 2, 3

[C] 5, 6

[D] None of the previous

40. Perform the addition and simplify: $\frac{x - 3}{x^2 - 5x + 4} + \frac{-x - 4}{x^2 + 3x - 4}$

[A] $\frac{-7x - 28}{(x + 4)(x - 1)}$

[B] $\frac{-7x + 28}{(x - 4)(x - 1)(x + 4)}$

[C] $\frac{1}{(x - 1)(x - 4)}$

[D] None of the previous

41. Simplify: $\sqrt[3]{128x^9}$

[A] $64x^3$

[B] $4x^3\sqrt{2}$

[C] $4x^3\sqrt[3]{2}$

[D] None of the previous

42. Simplify: $(9\sqrt{x} + 6)^2$

[A] $81x + 36$

[B] $81x + 54\sqrt{x} + 36$

[C] $81x + 108\sqrt{x} + 36$

[D] None of the previous

43. Solve: $\sqrt{x+4} + 2 = x$
[A] $\{0, 1\}$ [B] $\{0, 5\}$ [C] $\{5\}$ [D] None of the previous

44. Simplify: i^{27}
[A] i [B] -1 [C] $-i$ [D] None of the previous

45. Solve using the quadratic formula: $x^2 - 4x - 1 = 0$
[A] $2 \pm \sqrt{3}$ [B] $2 \pm \sqrt{12}$ [C] $4 \pm \sqrt{5}$ [D] None of the previous

46. Simplify: $\frac{4}{2-i}$
[A] $\frac{8}{3} - \frac{4}{3}i$ [B] $\frac{8}{3} + \frac{4}{3}i$ [C] $\frac{8}{5} - \frac{4}{5}i$ [D] None of the previous

47. Solve: $(x^2 + 10x + 25)^{3/4} - 9 = 18$
[A] $\left\{ \frac{-10 \pm \sqrt{-124}}{2} \right\}$ [B] $\{-14, 4\}$ [C] $\{5 + \sqrt{-31}\}$ [D] None of the previous

48. Solve: $x^2 - 2x > 8$
[A] $-2 < x < 4$ [B] $x > 4$
[C] $x < -2$ or $x > 4$ [D] None of the previous

49. Solve: $\frac{-x+9}{x-3} \geq 0$
[A] $3 < x \leq 9$ [B] $x > 3$ or $x \leq 9$
[C] $x < 3$ or $x \geq 9$ [D] None of the previous

50. Find the center and radius of the circle whose equation is $x^2 + y^2 - 8x - 4y - 16 = 0$.
[A] $(4, 2)$ $r = 36$ [B] $(-4, -2)$ $r = 6$
[C] $(-4, -2)$ $r = 36$ [D] None of the previous