

Practice Questions

Algebra 1/ Level 1 Test

1. Expand: $(x-1)(x^2-x-1)$

- (A) x^3+x+1
- (B) x^3-x+1
- (C) x^3+2x^2+1
- (D) x^3-2x^2+1
- (E) None of these

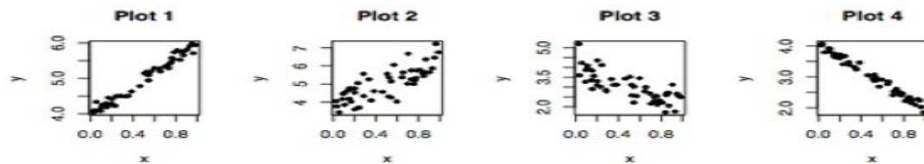
2. State the Domain of the function: $h(x)=\sqrt{x^2-x-6}$

- (A) $x \leq -2$ or $x \geq 3$
- (B) $x \leq -\sqrt{6}$ and $x \geq \sqrt{6}$
- (C) $x \geq 0$
- (D) $0 \leq x \leq 3$
- (E) $-2 \leq x \leq 3$

3. For real numbers x and y , define $x \square y = (x+y)(x-y)$. What is $3 \square (4 \square 5)$?

- (A) -72
- (B) 7
- (C) -2
- (D) 60
- (E) None of these

4. Plot 1, Plot 2, Plot 3, and Plot 4 below each show scatterplots of two quantitative variables, x and y . Choose the letter corresponding to the correct statements below.



- (A) Plots 1 and 4 show positive linear associations between x and y .
- (B) The linear associations between x and y in Plots 1 and 4 are stronger than those in Plots 2 and 3.
- (C) Each of the plots show a cause-and-effect relationship between x and y .
- (D) Exactly two of the above statements are true.
- (E) Choices (A), (B), and (C) are true.

5. The set of solutions of the equation $2|x-3|-7=-5$ is:

- (A) $\{1, 4\}$
- (B) $\{-1, 3\}$
- (C) $\{-1, -3\}$
- (D) $\{2, 4\}$
- (E) $\{4, 8\}$

6. Write an expression that corresponds to the following word sentence for n , an even integer:

“Twice the sum of two consecutive even integers is eleven less than one fourth of their product.”

- (A) $2[n+(n+1)] = \frac{1}{4}[n(n+1)-11]$
- (B) $2[n+(n+2)] = \frac{1}{4}[n(n+2)]-11$
- (C) $2[n+(n+2)] = \frac{1}{4}[n(n+1)-11]$
- (D) $2[n+(n+1)] = \frac{1}{4}[n(n+1)]-11$
- (E) None of these

7. What is the perimeter of a triangle ABC where $A = (-2, 5)$, $B = (12, 3)$, and $C = (10, -11)$?

- (A) 80
- (B) $20 + 40\sqrt{2}$
- (C) 60
- (D) $40\sqrt{2}$
- (E) $20 + 20\sqrt{2}$

8. Solve: $3\sqrt{5x-1}-12=9$

- (A) $\frac{8}{5}$
- (B) 4
- (C) $\frac{3}{5}$
- (D) 10
- (E) None of these

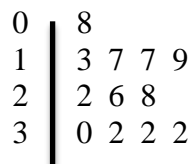
9. Determine the formula of an exponential function in the form $y = a \bullet b^x$ which passes through the points $(2, 1)$ and $(5, 27)$. What is the value of the sum $a + b$?

- (A) $\frac{1}{3}$
- (B) $\frac{28}{9}$
- (C) $\frac{22}{7}$
- (D) $\frac{6}{17}$
- (E) None of these

10. Which number is one-ninth of 27^9 ?

- (A) 27^8
- (B) 9^{12}
- (C) 3^{25}
- (D) 6^{15}
- (E) 7^{15}

11. Below is a stem-and-leaf plot. Which two values for this data are the same?



- (A) mean and median
- (B) mean and mode
- (C) mean and range
- (D) median and mode
- (E) median and range

12. Find the sum of all solutions to $x^{\frac{1}{2}} - 5x^{\frac{1}{4}} + 6 = 0$

- (A) 97
- (B) 103
- (C) 81
- (D) 74
- (E) 80

13. If $3^{x^2+4} = 81^x$ and $2^{8y} = 16$, find y^x .

- (A) $\frac{1}{3}$
- (B) $\frac{1}{2}$
- (C) $\frac{1}{4}$
- (D) $\frac{1}{8}$
- (E) $\frac{2}{3}$

14. A circle of radius 1 is centered at $(1, 3)$. Another circle of radius 2 is centered at $(4, k)$. If the centers are located at a distance of $\sqrt{13}$ units apart, and both circles are located in Quadrant I, what is k ?

- (A) 1
- (B) 5
- (C) 4
- (D) 3
- (E) 6

15. When x is 1, y is 2. If y varies directly as x , what is the value of y when $x = 5$?

- (A) 2.5
- (B) 5.5
- (C) 7
- (D) 7.5
- (E) 10

16. A cashier has 25 coins consisting of nickels, dimes, and quarters, with a combined value of \$4.90. If the number of dimes is 1 less than twice the number of nickels, how many of each type of coin does she have?

- (A) 2 nickels, 6 dimes, 15 quarters
- (B) 4 nickels, 7 dimes, 14 quarters
- (C) 2 nickels, 3 dimes, 20 quarters
- (D) 3 nickels, 5 dimes, 17 quarters
- (E) There is insufficient information to determine a unique solution

17. Given the following matrices: $A = \begin{bmatrix} 2 & -5 \\ -3 & 2x \\ 4 & -7 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & -1 \\ -5 & 8 \\ 2y & 3 \end{bmatrix}$.

If $2A - 3B = \begin{bmatrix} -8 & -7 \\ 9 & -12 \\ 14 & -23 \end{bmatrix}$, Find $-8x + 4y$.

- (A) 28
- (B) -28
- (C) -4
- (D) 20
- (E) -20

18. Evaluate: $\frac{(4 \cdot 3 + 13) \div |5| \cdot 3^2}{-2^2 - 3| -2 | \div 2 + 4}$

- (A) 9
- (B) -27
- (C) -45
- (D) -15
- (E) None of these

19. Simplify: $\left(\frac{pr^2s^{-5}}{2s^{-2}p^3r^{-3}} \right)^{-2}$

- (A) $\frac{s^{14}}{4p^4}$
- (B) $\frac{p^4s^6}{4r^{10}}$
- (C) $\frac{4s^{14}}{p^4}$
- (D) $\frac{4p^4s^6}{r^{10}}$
- (E) None of these

20. If x is a real number such that $\frac{3}{x+2} - \frac{5}{x} = \frac{13}{x+2}$, find the value of $\frac{9}{x}$.
- (A) $\frac{-21}{7}$
(B) $\frac{-18}{5}$
(C) $\frac{-19}{3}$
(D) $\frac{-27}{2}$
(E) None of these

21. Simplify: $\frac{1 - \frac{2y}{x} + \frac{y^2}{x^2}}{1 - \frac{y^2}{x^2}}$

- (A) $\frac{x-y}{x+y}$
(B) $\frac{x-2y}{x}$
(C) $2xy$
(D) $\frac{2y+x}{x-y}$
(E) $\frac{2y}{x}$

22. Solve for x : $cx+6 = dx-1$

- (A) $\frac{-7}{d-c}$
(B) $\frac{7}{c+d}$
(C) $\frac{7}{d-c}$
(D) $\frac{-7}{c+d}$
(E) None of these

23. A gardener wants to construct a raised bed garden to grow food for the local food bank. The garden will form a quadrilateral with vertices $(1, 1)$, $(5, 1)$, $(2, 6)$, and $(7, 6)$. The borders of the quadrilateral will be made from four pieces of wood, with one piece of wood comprising each side. The pieces of wood are available for purchase in lengths of k units, where $k = 4, 8, 12, 16$. The costs of each of these pieces of wood are $\$(k + 1)$, for $k = 4, 8, 12, 16$ respectively. Larger pieces can be cut into smaller pieces at no cost; for example, a piece of wood length 16 can be cut into 4 pieces of length 4 for a cost of \$17 (cost of 1 piece of 16-unit wood). Find the minimum cost of the wood for the garden.

- (A) \$22
- (B) \$23
- (C) \$24
- (D) \$25
- (E) \$26

24. A chemist has a 25% and a 50% acid solution. How much of each solution should be used to form 200 mL of a 35% acid solution?

- (A) 100 mL of the 25% solution, 100 mL of the 50% solution
- (B) 90 mL of the 25% solution, 110 mL of the 50% solution
- (C) 120 mL of the 25% solution, 80 mL of the 50% solution
- (D) 110 mL of the 25% solution, 90 mL of the 50% solution
- (E) 80 mL of the 25% solution, 120 mL of the 50% solution

25. The table below summarizes grade and attendance data for 33 students in a professor's college statistics class. Use this information to determine which of the statements below are true. (Note: "Not A" means a grade other than an "A")

	Attendance A	Attendance Not A	Total
Course Grade A	12	3	15
Course Grade Not A	6	12	18
Total	18	15	33

- (A) Considering only students with an A for attendance, $\frac{12}{18}$ earned an A for the course.
- (B) Considering only students who do not have an A for attendance, 20% earned an A for the course.
- (C) Approximately 45.45% of students in the course earned an A for the course grade.
- (D) Exactly two of the statements above are true.
- (E) Choices (A), (B), and (C) are true.

26. What is the greatest common factor of $56(xy)^2 - 42x^2y^3 - 28x^3y$?

- (A) $4x^2y$
- (B) $4x^2y^2$
- (C) $7x^2y$
- (D) $7x^2y^2$
- (E) None of the above choices are the greatest common factor.

27. A region is defined by this system:
$$\begin{cases} y \geq x^2 - 2x - 5 \\ y \leq 3x - 4 \end{cases}$$

In which quadrants of the coordinate plane is the region located?

- (A) I and III
- (B) III and IV
- (C) I and III and IV
- (D) I and II and III
- (E) I and IV

28. The Rhind papyrus is a famous historical document from the Egyptian Middle Kingdom that dates to 1650 B.C. It is probably the best example of an ancient Egyptian mathematics textbook. A

problem from the Rhind Papyrus states the following: A quantity and its $\frac{2}{3}$, its $\frac{1}{2}$, and its $\frac{1}{7}$ added together becomes 388. What is this quantity?

- (A) 84
- (B) 168
- (C) 42
- (D) 126
- (E) 296

29. To pour a concrete sidewalk takes 2 hours of preparation and 3 hours of finishing. To pour a concrete patio takes 4 hours of preparation and 3 hours of finishing. There are 16 hours available for preparation and 21 hours available for finishing. ABC Concrete Company makes a profit of \$450 on a sidewalk and \$400 on a patio. How many sidewalks and patios should the company construct in order to maximize profit? Choose the answer that gives the correct number of sidewalks.

- (A) 4 sidewalks
- (B) 5 sidewalks
- (C) 6 sidewalks
- (D) 7 sidewalks
- (E) None of these

30. Write an equation for the line that contains the point $(1, -2)$ and is perpendicular to the line described by: $8x - 3y - 6 = 0$

- (A) $3x - 8y - 19 = 0$
- (B) $8x - 3y - 14 = 0$
- (C) $8x + 3y - 2 = 0$
- (D) $3x + 8y + 13 = 0$
- (E) None of these

Practice Test Solutions

1	D
2	A
3	A
4	B
5	D
6	B
7	E
8	D
9	B
10	C
11	E
12	A
13	C
14	B
15	E
16	D
17	B
18	D
19	D
20	D
21	A
22	C
23	A
24	C
25	E
26	E
27	C
28	B
29	D
30	C

