

Level 4 - Algebra 2 Huddle-2015

- This of the following statements below could be used to disprove "If p is a prime number, then p is three less than a multiple of four?"
 - Seven is prime
 - Nine is not prime
 - Some even numbers are not prime
 - Five is prime
 - Not all odd numbers are prime
- Find all values of k so that the given points are $\sqrt{29}$ units apart. $(-5, 5), (k, 0)$
 - 3
 - 7
 - 7
 - 3
 - none
- A motorcycle and a car leave an intersection at the same time. The motorcycle heads north at an average speed of 20 miles per hour, while the car heads east at an average speed of 48 miles per hour. Find an expression for their distance apart in miles at the end of t hours.
 - $2t\sqrt{13}$ miles
 - $t\sqrt{68}$ miles
 - $52t$ miles
 - $52\sqrt{t}$ miles
 - none
- Given that $\frac{3}{2} < x < \frac{5}{2}$, find the value of $\sqrt{x^2 - 2x + 1} + \sqrt{x^2 - 6x + 9}$.
 - 1
 - 2
 - $2x - 4$
 - $4 - 2x$
 - none
- The medians of a triangle intersect at a point. The distance from the vertex to the point is exactly two-thirds of the distance from the vertex to the midpoint of the opposite side. Find the exact distance of that point from the vertex $A(3, 4)$ of a triangle, given that the other two vertices are at $(0, 0)$ and $(8, 0)$.
 - $\frac{2\sqrt{17}}{3}$
 - 2
 - $\frac{8}{3}$
 - $\frac{\sqrt{17}}{3}$
 - none

6. List the intercepts for the graph of the equation. $4x^2 + y^2 = 4$
- $(-1, 0), (0, -4), (0, 4), (1, 0)$
 - $(-2, 0), (0, -1), (0, 1), (2, 0)$
 - $(-4, 0), (0, -1), (0, 1), (4, 0)$
 - $(-1, 0), (0, -2), (0, 2), (1, 0)$
 - none
7. If a graph is symmetric with respect to the origin and it contains the point $(-4, 7)$, which of the following points is also on the graph.
- $(4, -7)$
 - $(4, 7)$
 - $(-4, -7)$
 - $(7, -4)$
 - none
8. If $p(x) = 2x^3 + kx^2 + x$, find k such that $x - 1$ is a factor of $p(x)$.
- 3
 - $-\frac{1}{3}$
 - $\frac{1}{3}$
 - 3
 - none
9. Find an equation of the line containing the centers of the two circles
 $x^2 + y^2 - 6x - 2y + 9 = 0$ and $x^2 + y^2 + 2x + 12y + 33 = 0$
- $7x - 4y - 17 = 0$
 - $-5x - 2y - 17 = 0$
 - $-7x - 4y - 17 = 0$
 - $7x + 4y - 17 = 0$
 - none
10. Find the minimum value of $1 \otimes 2 \otimes 3 \otimes 4 \otimes 5 \otimes 6 \otimes 7 \otimes 8 \otimes 9$ where each " \otimes " is either a "+" or a "×".
- 84
 - 40
 - 44
 - 45
 - none
11. If $f(x) = \frac{x-B}{x-A}$, $f(6) = 0$, and $f(2)$ is undefined what are the values of A and B?
- $A = 2, B = 6$
 - $A = -6, B = -2$
 - $A = 6, B = 2$
 - $A = -2, B = -6$
 - none

12. Find the domain of $(f/g)(x)$.

$$f(x) = \sqrt{13-x} \text{ and } g(x) = \frac{x}{\sqrt{x-6}}$$

- a. $\{x \mid 6 < x \leq 13; x \neq 0\}$
- b. $\{x \mid 6 < x < 13; x \neq 0\}$
- c. $\{x \mid x \neq 0, 6, 13\}$
- d. $\{x \mid \sqrt{6} \leq x \leq \sqrt{13}\}$
- e. none

13. A rectangle that is x feet wide is inscribed in a circle of radius 37 feet. Express the area of the rectangle as a function of x .

- a. $A(x) = x^2\sqrt{2738-x^2}$
- b. $A(x) = x(5476-x^2)$
- c. $A(x) = x\sqrt{5476-x^2}$
- d. $A(x) = x\sqrt{4107-x}$
- e. none

14. If $\log_2 x + \log_2 5 = \log_2 x^2 - \log_2 14$, then

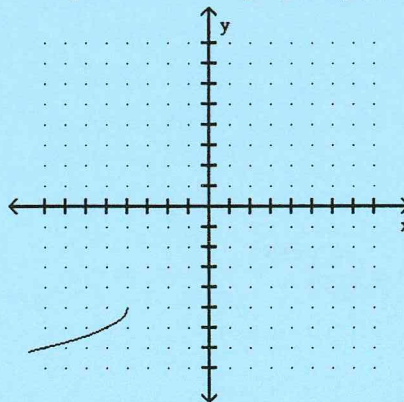
- a. $x = 0$
- b. $x = \sqrt{70}$
- c. $x = 0, 70$
- d. $x = 2^{70}$
- e. none

15. A farmer's silo is the shape of a cylinder with a hemisphere as the roof. If the height of the silo is 78 feet and the radius of the hemisphere is r feet, express the volume of the silo as a function of r .

- a. $V(r) = \pi(78-r) + \frac{4}{3}\pi r^2$
- b. $V(r) = \pi(78-r)r^3 + \frac{4}{3}\pi r^2$
- c. $V(r) = \pi(78-r)r^2 + \frac{2}{3}\pi r^3$
- d. $V(r) = 78\pi r^2 + \frac{8}{3}\pi r^3$
- e. none

16. For $a, b, c < 0$; which of the following could be the equation for the graph of $f(x)$?

- a. $f(x) = -a\sqrt{b-x} + c$
- b. $f(x) = a\sqrt{x+b} - c$
- c. $f(x) = a\sqrt{x-b} + c$
- d. $f(x) = a\sqrt{b-x} + c$
- e. none



17. Solve the inequality.

$$\frac{8x}{7-x} > 4x$$

- a. $(-\infty, 5] \cup [7, \infty)$
- b. $[7, \infty)$
- c. $(-\infty, 0) \cup (5, 7)$
- d. $[0, 5] \cup [7, \infty)$
- e. none

18. How many integers n satisfy $|n^3 - 222| < 888$

- a. 11
- b. 17
- c. 18
- d. 19
- e. none

19. Use the given zero to find the remaining zeros of the function.

$$f(x) = 2x^4 - 15x^3 + 45x^2 - 45x + 13; \quad \text{zero: } 3 + 2i$$

- a. $3 - 2i, 1, 1/2$
- b. $3 - 2i, -1, 1/2$
- c. $2 - 3i, 1, -1/2$
- d. $2 - 3i, -1, -1/2$
- e. None

20. Find the domain of the composite function $f \circ g$.

$$f(x) = \sqrt{x-2} \quad \text{and} \quad g(x) = \frac{2}{x-8}$$

- a. $\{x \mid x \neq 8, x \neq 2\}$
- b. $\{x \mid x \geq 2, x \neq 8\}$
- c. $\{x \mid 8 < x \leq 9\}$
- d. $\{x \mid x \text{ is any real number}\}$
- e. none

21. If $7^x = 3$, what does 7^{-3x} equal?

- a. 27
- b. $1/9$
- c. $1/27$
- d. -27
- e. none

22. Solve the equation. $e^{x-3} = \left(\frac{1}{e^3}\right)^{x+5}$

- a. -3
- b. 2
- c. -9
- d. -4
- e. none

23. Identify the equation.

$$3x^2 + 4y^2 - 36x + 32y + 160 = 0$$

- a. ellipse
- b. parabola
- c. hyperbola
- d. circle
- e. not a conic

24. Let $A = \begin{bmatrix} 0 & -1 \\ 3 & 0 \\ 6 & 6 \end{bmatrix}$, $B = \begin{bmatrix} -6 & 0 \\ 1 & 1 \\ 5 & 3 \end{bmatrix}$, and $C = \begin{bmatrix} -6 & 1 & 3 \\ 0 & -5 & -1 \end{bmatrix}$. Find $C(A - B)$.

- a. $\begin{bmatrix} 42 & 15 \\ 1 & -8 \end{bmatrix}$
- b. $\begin{bmatrix} -31 & 14 \\ -11 & -2 \end{bmatrix}$
- c. $\begin{bmatrix} 1 & -8 \\ 42 & 15 \end{bmatrix}$
- d. $\begin{bmatrix} -48 & 4 \\ 20 & -1 \end{bmatrix}$
- e. None

25. Solve for x .

$$\begin{bmatrix} x & 1 & 5 \\ 1 & x & -3 \\ 0 & 1 & 5 \end{bmatrix} = 4x$$

- a. $x = 0, 1/5$
- b. $x = 1/5$
- c. $x = 0, -1/5$
- d. $x = -1/5$
- e. none

26. The given matrix is nonsingular. Find the inverse of the matrix.

$$\begin{bmatrix} 2 & 1 \\ -a & a \end{bmatrix}$$

- a. $\begin{bmatrix} -1 & \frac{1}{a} \\ 1 & -\frac{2}{a} \end{bmatrix}$
- b. $\begin{bmatrix} \frac{2}{a} & \frac{1}{a} \\ 1 & 1 \end{bmatrix}$
- c. $\begin{bmatrix} -\frac{2}{a} & \frac{1}{a} \\ 1 & -1 \end{bmatrix}$
- d. $\begin{bmatrix} 1 & -\frac{1}{a} \\ -1 & \frac{2}{a} \end{bmatrix}$
- e. none

27. The sum of the squares of two numbers is 90. The difference of the two numbers is -12 . Find the two numbers.
- $(-3$ and $9)$ or $(-9$ and $3)$
 - $(-9$ and $-3)$ or $(3$ and $9)$
 - $(-3$ and $9)$
 - $(-9$ and $3)$
 - none

28. The sequence is defined recursively. Write the first four terms.

$$a_1 = \sqrt{7}; a_n = \sqrt{7a_{n-1}}$$

- $a_1 = \sqrt{7}, a_2 = 7\sqrt{7}, a_3 = 49\sqrt{7}, a_4 = 343\sqrt{7}$
- $a_1 = \sqrt{7}, a_2 = 7, a_3 = 7\sqrt{7}, a_4 = 49$
- $a_1 = \sqrt{7}, a_2 = \sqrt{7\sqrt{7}}, a_3 = \sqrt{7\sqrt{7\sqrt{7}}}, a_4 = \sqrt{7\sqrt{7\sqrt{7\sqrt{7}}}}$
- $a_1 = \sqrt{7}, a_2 = \sqrt{\sqrt{7}}, a_3 = \sqrt{\sqrt{\sqrt{7}}}, a_4 = \sqrt{\sqrt{\sqrt{\sqrt{7}}}}$
- none

29. Suppose f is a real function satisfying $f(x + f(x)) = 4f(x)$ and $f(1) = 4$. What is $f(21)$?
- 64
 - 21
 - 105
 - 16
 - none

30. Find the sum.

$$\sum_{k=2}^{15} k(k-8)$$

- 273
 - 280
 - 237
 - 299
 - none
31. Find the sum.
- $$-3 + 1 + 5 + 9 + 13 + \dots + (4n - 7)$$
- $n(2n + 5)$
 - $n(4n - 7)$
 - $n(2n - 5)$
 - $n(4n + 7)$
 - none
32. If $z = -x$, what are all the values of y for which $(x + y)^2 + (y + z)^2 = 2x^2$?
- $y = 0$
 - $y = 0, 1$
 - $y = -1, 0, 1$
 - All positive numbers
 - There are no values of y for which the equation is true.

33. $\left(1 - \frac{1}{2}\right)\left(1 - \frac{1}{3}\right) \dots \left(1 - \frac{1}{n+1}\right) = ?$

- a. $\frac{1}{n+1}$
- b. $\frac{1}{2n+1}$
- c. $\frac{n}{n+1}$
- d. $\frac{1}{n-1}$
- e. none

34. Find the third term in the binomial expansion.

$$(\sqrt{x} + \sqrt{3})^4$$

- a. $12\sqrt{3x}$
- b. $18x$
- c. $4\sqrt{3}x^{3/2}$
- d. $x^2 + 9$
- e. none

35. A ball is dropped from a height of 15 meters and always rebounds $\frac{2}{3}$ of the height of the height of the previous drop. If this process continues forever, how far does the ball travel?

- a. 90 meters
- b. 75 meters
- c. 45 meters
- d. 30 meters
- e. none

