

Note: "e. None of these" is a choice for every question, if the answer is not given or there is a problem with the question.

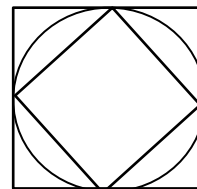
1. Find the value(s) of x : $-5 + x > -8(x + 4)$

- a. -3 b. 27 c. $x < 27$ d. $x > -3$

2. Solve for x : $x^2 - 8x + 11 = 0$

- a. $4 \pm \sqrt{5}$ b. $\frac{4 \pm \sqrt{5}}{2}$ c. $\frac{-8 \pm \sqrt{20}}{2}$ d. $8 \pm \sqrt{20}$

3. Rachel designed a quilt block using a square inscribed in a circle inscribed in a square. The inner square will be a red print, the area outside the circle will be a blue print, and the sections inside the circle and outside the smallest square will be a soft yellow. What percent of the figure will be made of yellow and blue fabric?



- a. 37.5% b. 50% c. 62.5% d. 28.5%

4. Solve for x : $\sqrt{3x - 2} = 7$

- a. 3 b. 9 c. 28 d. 17

5. Ben has a cube with side length s . Austin alters the cube so that one dimension is increased by 1, one is reduced by 1 and the third is left as is. The volume of Ben's original cube is 5 more than the volume of the Austin's new rectangular solid. What is the volume of Ben's cube?

- a. 8 b. 27 c. 64 d. 125

6. What are the restrictions on the domain of the function $f(x) = \frac{x^2 - x - 6}{x^2 - 5x - 6}$?

- a. $x \neq 3, -2$ b. $x \neq 6, -1$ c. $x \neq 3, -2, 6, -1$ d. $x \neq -3, 2$

7. Christina bought a can of chips in a cylinder 8 inches in height with a diameter of 5 inches. What is the volume of the cylinder of chips?

- a. $50\pi \text{ in}^3$ b. $200\pi \text{ in}^3$ c. 157 in^3 d. 628 in^3

8. When simplified, what will be the denominator of: $\frac{6}{\sqrt{7} - \sqrt{5}}$?

- a. 2 b. 12 c. 1 d. $2\sqrt{35}$

9. If $2x + \frac{2}{x} = 1$, then what is the value of $2x^2 + \frac{2}{x^2}$?

- a. $-\frac{7}{2}$ b. -7 c. $-\frac{2}{7}$ d. -2

10. Zoe's favorite number is $2^{10} - 4^0$. What is the greatest prime factor of her favorite number?

- a. 1023 b. 341 c. 17 d. 31

11. Lucy devilishly draws a 6 x 6 square which she then divided into unit squares. How many rectangles which are not squares can be found in Lucy's resulting figure?

- a. 350 b. 275 c. 134 d. 91

12. A set of numbers has both odd and even integers. If two are chosen at once, the probability that their product will be odd is $\frac{1}{5}$. Andy knows there are exactly 3 odd integers. How many even integers must be in the set?

- a. 12 b. 15 C. 18 d. 22

13. Simplify and write in scientific notation: $\frac{3.5 \times 10^{-12}}{5.6 \times 10^{18}}$

- a. 8.75×10^{-30} b. 8.75×10^{-31} c. $.875 \times 10^{-31}$ d. 8.75×10^{30}

14. Crawford carefully aims his angry bird, using an equation of $h = -16t^2 + 60t$, where t is the time in milliseconds (ms) and h is the height at the given time. Unfortunately, the bird sails over everything and simply lands on the ground. How long does the flight take?

- a. 0.75 ms b. 3.75 ms c. 1.5 ms d. 2.25 ms

15. Find the sum of the roots of $x^2 - 5x + 7 = 0$.

- a. 5 b. $\frac{5}{2}$ c. 7 d. $\frac{7}{5}$

16. The sound of mad laughter echoes through the halls as Dr. Fox's science class mixes up another potion. This time he uses a mixture of laughing liquid with Diet Coke. How much Diet Coke is needed to convert 100 mL of 75% laughing liquid solution to a more manageable 30% solution?

- a. 100mL b. 120mL c. 150mL d. 175mL

17. If $ab = 6$, $bc = 8$, and $ac = 12$, find the value of $a^2 + b^2 + c^2$.

- a. 29 b. 16 c. 22.5 d. 41.5

18. A line segment has endpoints at (-5, 4) and (6,3). What is the equation of the line with slope $\frac{1}{3}$ that passes through its midpoint?

- a. $y = \frac{1}{3}x - \frac{10}{3}$ b. $3y = -x + 10$ c. $y = \frac{3}{2}x - 19$ d. $x - 3y = -10$

19. Daniel, Quinton, Christopher, and Avi each flip a penny while hiding from Mrs. Clopton. Quinton keeps the pennies if they are all heads, Daniel if they are all tails, Christopher if there are more heads than tails, and Avi if there are more tails than heads. What is the probability that Avi gets the 4 cents?

- a. $\frac{1}{8}$ b. $\frac{1}{16}$ c. $\frac{5}{16}$ d. $\frac{1}{4}$

20. The clock in the classroom should have shown 8:45 AM when you began the test. What time should it be after the second hand makes 2012 complete revolutions?

- a. 5:41 AM b. 8:21 PM c. 6:17 PM d. 2:46 AM

21. Give the standard form of the equation of a line perpendicular to $2x - 3y = 6$ which passes through the origin.

- a. $2x + 3y = 0$ b. $3x + 2y = 0$ c. $y = -\frac{2}{3}x$ d. $y = \frac{3}{2}x$

22. For how many integers is $x^2 = |x|$?

- a. 1 b. 2 c. 3 d. 4

23. The solutions to $2x^2 + 9x + 7 = 0$ are a and b. What is the value of $a^2 + b^2$?

- a. $\frac{81}{4}$ b. $\frac{49}{4}$ c. $\frac{53}{4}$ d. $-\frac{81}{4}$

24. Simplify: $\frac{(x^2+3x-4)(x^2-9)}{(x^2+8x+15)(x^2-1)}$

- a. $\frac{(x-4)(x-3)}{(x+5)(x-1)}$ b. $\frac{x^2+x-12}{x^2+6x+5}$ c. $\frac{(x+4)(x-3)}{(x-5)(x+1)}$ d. $\frac{x^2-x+12}{x^2+6x-5}$

25. Two congruent circles overlap so that they each pass through the other's center. The outer perimeter of the shape measures 8π . A quadrilateral is formed connecting the intersection points and the centers. What is the area of this quadrilateral?

- a. $\frac{9\sqrt{3}}{4}$ b. $\frac{9\sqrt{3}}{2}$ c. $\frac{6\sqrt{3}}{5}$ d. $\frac{8\sqrt{3}}{3}$

Tiebreakers

1. $(12345 \times 12346) - (12344 \times 12347) = ?$
2. The sum of two numbers is 15. Their product is -28. What is the sum of the reciprocals of the two numbers?
3. Find the number of distinct arrangements of $\frac{NEVER\ ODD\ OR\ EVEN}{MADAM,\ I'M\ ADAM}$.

(Please ignore the spacing and punctuation!)