

OU Math Day 2024

Algebra I Test

1. Two mystery numbers have sum 14 and product 45. What is the smaller mystery number?

- (A) 3 (B) 5 (C) 7 (D) 8 (E) None of the above
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2. Which of the following numbers is closest to $\sqrt[2]{2024}$?

- (A) 10 (B) 25 (C) 50 (D) 100 (E) 1000
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3. Which of the following numbers is closest to $\frac{7}{3} + \frac{3}{7}$?

- (A) 1 (B) 2 (C) 3 (D) 4 (E) 5
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4. Which of the following is **not** a divisor of 2024?

- (A) 4 (B) 7 (C) 11 (D) 23 (E) None of the above
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5. How many different real numbers satisfy the equation $x - 3 = 1 - x$?

- (A) 0 (B) 1 (C) 2 (D) 4 (E) None of the above
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6. Which of the following numbers is **not** a perfect square?

- (A) 49 (B) 121 (C) 225 (D) 444 (E) None of the above
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7. How many minutes are in one week?

- (A) 10080 (B) 36524 (C) 86400 (D) 525600 (E) None of the above
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8. A toy rocket blasts off, reaches a height of 72 feet, and then lands 12 seconds after blast off. Which of the following functions could describe the height (in feet) of the rocket t -seconds after it blasts off?

- (A) $f(t) = t^2 + 12t - 36$ (B) $f(t) = 2t^2 + 18t$ (C) $f(t) = 24t - 2t^2$
(D) $f(t) = 12t^2 + 6t^2$ (E) None of the above
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9. Which of the following numbers is the largest?

- (A) $\frac{3}{(\frac{5}{4})}$ (B) $\frac{3}{(\frac{4}{5})}$ (C) $\frac{4}{(\frac{5}{3})}$ (D) $\frac{4}{(\frac{3}{5})}$ (E) $\frac{5}{(\frac{4}{3})}$
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10. How many real solutions are there to the equation $|x + 1| = -1$?

- (A) 0 (B) 1 (C) 2 (D) Infinitely many (E) None of the above
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11. Which of the following is equal to $\left(\sqrt{3^{\sqrt{2}}}\right)^{\sqrt{2}}$?

- (A) 3 (B) $3^{\sqrt{2}}$ (C) $\sqrt{3^{\sqrt{6}}}$ (D) $\sqrt{6^{\sqrt{2}}}$ (E) None of the above
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12. A case of 20 sodas costs \$16, and a pack of 6 sodas costs \$5. What is the largest number of sodas you can buy with \$120?

- (A) 140 (B) 144 (C) 146 (D) 148 (E) None of the above
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13. Three of the following points are on the same line. Which point is not on this line?

- (A) $(-1, 2)$ (B) $(0, 1)$ (C) $(1, 1)$ (D) $(3, 0)$
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14. Normal dice have the numbers 1, 2, 3, 4, 5, 6 on their sides, and each side is equally likely to be rolled. What is the probability of getting a total of 5 when rolling two dice?

- (A) $1/6$ (B) $1/9$ (C) $5/36$ (D) $1/4$ (E) None of the above
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15. A football team can only score 3, 6, or 7 points at a time (without rare scoring situations). What is the largest point total that is impossible (without rare scoring situations)?

- (A) 8 points (B) 11 points (C) 16 points (D) 23 points (E) None of the above
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16. Terrance and Robert are racing 100 meters. Terrance starts running at 4 meters per second. Robert confidently waits at the starting line until Terrance has ran 40 meters, then he starts running at 6 meters per second. Who wins the race?

(A) Terrance (B) Robert (C) They finish at the same time

17. A homework assignment had 10 easy questions (all worth the same) and 5 hard questions (all worth the same) for a total of 50 points. You got 5 easy questions and 4 hard questions right, for a total of 34 points. How much was one easy question worth?

(A) 1 (B) 2 (C) 4 (D) 6 (E) None of the above

18. Each of the 120 guests at a fancy dinner must choose chicken, beef, or fish. If three times as many people choose beef than choose fish, and 20 more people choose chicken than choose fish, how many people chose chicken?

(A) 20 guests (B) 30 guests (C) 40 guests (D) 60 guests (E) None of the above

19. What is the sum of all the real solutions to the equation $x^2 - 5x + 6 = 0$?

(A) 2 (B) 3 (C) 5
(D) There are no real solutions (E) None of the above

20. Which of the following integers is closest to the sum $1 + \frac{1}{2} + \frac{1}{3} + \cdots + \frac{1}{10}$?

- (A) 2 (B) 3 (C) 5 (D) 8 (E) 10
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21. You are blindly grabbing socks out of a drawer. If the drawer has 4 black socks and 6 white socks, how many socks do you have to grab before you are guaranteed to have 2 socks of the same color?

- (A) 2 (B) 3 (C) 4 (D) 6 (E) None of the above
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22. Let a, b, c be integers satisfying the Pythagorean Equation $a^2 + b^2 = c^2$. If you know that the three integers a, b, c are not all even, how many of them must be odd?

- (A) 0 (B) 1 (C) 2 (D) 3 (E) None of the above
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23. What is the last digit of 2024^{2024} (that is, the one immediately left of the decimal point)?

- (A) 0 (B) 2 (C) 4 (D) 6 (E) 8
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