OU Math Day 2023

Algebra I Test

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1. Which of the following numbers is largest?

   (A) $\frac{3}{1/7}$ (B) $\frac{1}{7/3}$ (C) $\frac{7}{3/1}$ (D) $\frac{1}{3/7}$

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2. If a and b are two numbers whose sum is equal to 7 and whose product is equal to 11, what is the value of $(a-b)^2$?

   (A) 5 (B) 7 (C) 29 (D) 49 (E) None of the above

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3. What day of the week will it be 50 days from today?

   (A) Monday (B) Wednesday (C) Thursday (D) Friday (E) None of the above

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4. The sum of four consecutive numbers is 130. What is the smallest of the four numbers?

   (A) 31 (B) 34 (C) 37 (D) 41 (E) None of the above

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5. The price of a shirt starts out at \$60. The price is increased by 25%, after which it decreases by 50%. What is the final price of the shirt?

   (A) \$30 (B) \$37.50 (C) \$45 (D) \$50 (E) None of the above

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6. Which of the following fractions is equal to $\frac{\frac{4}{7}-\frac{3}{2}}{\frac{2}{3}+\frac{7}{4}}$?

(A) $\frac{6}{7}$ (B) 1 (C) $\frac{31}{28}$ (D) $\frac{841}{168}$ (E) None of the above

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7. If x^4 is equal to a hundred million, which of the following could be x?

(A) 10 (B) 100 (C) 1000 (D) $10,000$ (E) None of the above

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8. Which of the following is equal to $2\sqrt{12}\sqrt{15}\sqrt{3}$?

(A) $6\sqrt{15}$ (B) $15\sqrt{12}$ (C) $4\sqrt{3}\sqrt{45}$ (D) $\sqrt{30}\sqrt{36}$ (E) None of the above

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9. Which of the following numbers is a solution to the inequality $x < 1/x$?

(A) 5/4 (B) 1 (C) 5/6 (D) $\sqrt{4}$ (E) None of the above

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10. How many different numbers satisfy the equation $x^2 = 11$?

(A) 0 (B) 1 (C) 2 (D) 4 (E) None of the above

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11. What is the slope of the line defined by the equation $10x - 5y = 10$?

(A) -5 (B) -2 (C) 2 (D) 10 (E) None of the above

12. Mabel's older brother is four times older than her. In two years, he will be three times older than her. How long from now until he is twice as old as her?

(A) Four years (B) Six years (C) Eight years (D) Twelve years (E) None of the above

13. Two high school classes took the same test. One class of 30 students got an average of 80%, while the other class of 20 students got an average of 70%. What is the average grade for all the students?

(A) 73% (B) 75% (C) 76% (D) 78% (E) None of the above

14. If $2a + b = 11$ and $a + 2b = 13$, what is a?

(A) 3 (B) 4 (C) 5 (D) 7 (E) None of the above

15. Is the quantity $2\sqrt{3} - 3\sqrt{2}$ positive, negative, or zero?

(A) Positive (B) Negative (C) Zero

16. What is the sum of the integer solutions to the equation $|x - 3| \leq 4$?

(A) 3 (B) 7 (C) 15 (D) 27 (E) None of the above

17. Which of the following integers is closest to the cube root of 2023?

(A) 10 (B) 13 (C) 15 (D) 22 (E) None of the above

18. Which of the following is not a divisor of 2023?

(A) 7 (B) 17 (C) 49 (D) 119 (E) None of the above

19. Three of the following points are on the same line. Which point isn't on this line?

(A) (-4,-3) (B) (2,6) (C) (4,9) (D) (8,12)

20. How many positive integers are three digits long but do not contain 7 as a digit?

(A) 648 (B) 732 (C) 810 (D) 900 (E) None of the above

21. Matilda has pennies, nickels, and dimes in her pocket. If the total number of coins is 17, and the total value of the coins is \$.68 (that is, 68 cents), how many nickels does she have?

(A) 3 (B) 4 (C) 6 (D) 8 (E) None of the above

22. A restaurant sells chicken nuggets in packs of 6, 9, and 20. You could buy 32 nuggets by getting two packs of 6 and one pack of 20, but there's no way to buy just 8 nuggets. Which of the following numbers of nuggets is impossible to buy (without getting extra)?

(A) 21 (B) 38 (C) 43 (D) 51 (E) None of the above

Answers for the 2023 Algebra I Test:

1–5: AADAB

6–10: EBCCC

11–15: CCCAB

16–20: DBCDA

21–22: CC