OU Math Day 2015

Algebra 1 Test

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1. Solve the equation $21\,t + 3 = 0$ for t.

   (A) $1/7$ (B) $-1/7$ (C) -7 (D) 7 (E) None of the above

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2. What is the value of $3^{2^3}/27$?

   (A) 2187 (B) 729 (C) 243 (D) 81 (E) None of the above

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3. Evaluate the expression $-2x^5 + 3x^4 - 5x^3 - x^2 + 2x - 1$ when $x = 2$.

   (A) 143 (B) -121 (C) -57 (D) -49 (E) None of the above

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4. A pair of integers satisfies the properties that one integer is one more than twice the other and that the two integers sum to 34. What is larger of the two numbers?

   (A) 23 (B) 20 (C) 14 (D) 27 (E) None of the above

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5. What is the largest divisor of 2015 which is smaller than 2015?

   (A) 155 (B) 65 (C) 5 (D) 403 (E) None of the above

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6. The reciprocal of $\dfrac{3}{2/7}$ is

(A) $2/21$ (B) $6/7$ (C) $21/2$ (D) $7/6$ (E) None of the above

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7. Which of the following equations is **NOT** an identity which holds true for all numbers x and y?

(A) $x^2 - y^2 = (x - y)(x + y)$ (B) $x + y = y + x$ (C) $\sqrt{x^2 + y^2} = x + y$
(D) $(x - y)^2 = x^2 - 2xy + y^2$ (E) None of the above

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8. If $x = 2$ is a solution to the equation $x^3 + 3x^2 + Bx - 3 = 0$ then what must B equal?

(A) $23/2$ (B) $-23/2$ (C) 2 (D) $-17/2$ (E) None of the above

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9. What is the value of $35^2 - 25^2$?

(A) 625 (B) 600 (C) 3600 (D) 100 (E) None of the above

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10. Which of the following is **NOT** equal to $\dfrac{2}{3} + \dfrac{1}{5}$?

(A) $\dfrac{23}{30} + \dfrac{1}{10}$ (B) $\dfrac{7}{15} + \dfrac{2}{5}$ (C) $\dfrac{4}{5} + \dfrac{1}{15}$ (D) $1 - \dfrac{2}{15}$ (E) $\dfrac{1}{2} - \dfrac{1}{8}$

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11. Solve for x where $\dfrac{x - 1}{2x + 1} = 21$.

(A) $x = 22/41$ (B) $x = -22/41$ (C) $x = -22/19$ (D) $x = 22/19$ (E) None of the above

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12. The decimal form for the number $625^{-1/2}$ is

(A) .1 (B) .04 (C) .4 (D) $-.4$ (E) None of the above

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13. How many seconds are there in one day?

(A) 3600 (B) 1440 (C) 86400 (D) 216000 (E) None of the above

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14. Which of the following fractions is smallest?

(A) 7/16 (B) 4/7 (C) 8/15 (D) 3/4 (E) 9/17

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15. Mike is three years older than Susan, and in two years he will be twice as old as Susan was last year. How old is Mike now?

(A) 12 (B) 6 (C) 7 (D) 10 (E) None of the above

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16. If B is 100% larger than A and A is 100% larger than C then how much larger than C is B?

(A) 100% (B) 200% (C) 300% (D) 400% (E) None of the above

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17. If $x = 4.001$ what integer is nearest to the value of $\dfrac{x-4}{\sqrt{x}-2}$?

(A) 0 (B) 4 (C) 10 (D) 96 (E) None of the above

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18. How many positive two-digit integers are there that are not multiples of 3?

(A) 30 (B) 31 (C) 60 (D) 61 (E) None of the above

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19. All of the solutions to the equation $\sqrt{x^2} = 169$ are

(A) $x = \pm 13$ (B) $x = 2197$ (C) $x = 28561$ (D) $x = \pm 169$ (E) None of the above

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20. What does $6^0 + 6^1 + 6^2 + 6^3 + 6^4 + 6^5$ divided by $6^6 - 1$ equal?

(A) 6^6 (B) $\frac{1}{6}$ (C) 6^6 (D) $\frac{1}{5}$ (E) None of the above

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21. Find the simplest radical form of $\sqrt{21}\sqrt{63}\sqrt{15}/7$

(A) $63\sqrt{5}$ (B) $18\sqrt{10}$ (C) $\sqrt{10}$ (D) $6\sqrt{10}$ (E) None of the above

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22. What is the last digit of the number 2^{2015}?

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

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23. Which of the listed integers is biggest?

(A) 2^{2015} (B) 20^{15} (C) 10^{40} (D) 2015^2 (E) $1^{2015^{2015}}$

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24. What is the smallest positive integer n for which it will be a Monday $10n$ days from today?

(A) 3 (B) 6 (C) 2 (D) 4 (E) None of the above
