OU Math Day 2003

ALGEBRA 1 TEST

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1. Which one of the following is NOT a prime number?

   (A) 59 (B) 79 (C) 89 (D) 119 (E) 139

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2. The grade in a certain course is determined by averaging a student's scores on four examinations. If a student scores 85, 86 and 93 on the first three exams, what must she score on the last exam in order to earn a course grade of 90?

   (A) 91 (B) 93 (C) 96 (D) 97 (E) None of the above.

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3. Which equals $-2^3 \cdot 2^{-3}$

   (A) -64 (B) -1 (C) 0 (D) 1 (E) 64

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4. The product of two positive numbers is 108 and their difference is 3. What is the sum of the two numbers?

   (A) 3 (B) 7 (C) 9 (D) 21 (E) None of the above.

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5. In a race of 1000 meters runner A beats runner B by 200 meters and runner A beats runner C by 500 meters. Assuming that the contestants all run at constant speeds, by how many meters does runner B beat runner C?

   (A) 300 (B) 375 (C) 450 (D) 500 (E) None of the above.

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6. Simplify the expression $\sqrt[3]{16x^6y^4z^2}$

(A) $4x^3y^2z$ (B) $2x^3y\left(\sqrt[3]{4xyz}\right)$ (C) $2x^2y\left(\sqrt[3]{2yz^2}\right)$ (D) $2x^2yz\left(\sqrt[3]{4yz^2}\right)$ (E) None of the above.

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7. Of the integers between 1 and 1000 how many are divisible by all of the numbers 3, 4, 5 and 6?

(A) 14 (B) 15 (C) 16 (D) 17 (E) None of the above.

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8. If $5 - 2x = 0$ then what does x equal?

(A) 2/5 (B) $-2/5$ (C) 5/2 (D) $-5/2$ (E) None of the above.

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9. A woman is presently five times as old as her daughter is. In 15 years, she will be twice as old as her daughter. How old is the woman now?

(A) 21 (B) 25 (C) 30 (D) 32 (E) None of the above.

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10. Which of the following equals $\frac{1}{6} + \frac{1}{10}$?

(A) $\frac{1}{8}$ (B) $\frac{4}{15}$ (C) $\frac{1}{15}$ (D) $\frac{1}{16}$ (E) None of the above.

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11. In a group of 15 students, five like math, nine like art, and four like both math and art. How many students like neither math nor art?

(A) 1 (B) 3 (C) 5 (D) 10 (E) None of the above.

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12. What is the distance between the points $(-2, 8)$ and $(3, 5)$?

(A) $\sqrt{10}$ (B) $\sqrt{35}$ (C) 6 (D) $\sqrt{34}$ (E) None of the above.

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13. What is the degree of the polynomial $3x(x+2)(x^3-1)(x^7-1)$?

    (A) 7 (B) 10 (C) 11 (D) 12 (E) None of the above.

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14. An electronics store is having a 30% off sale. A DVD player is on sale for \$203. What would the same DVD player sell for if it were on sale at only 20% off?

    (A) \$210.12 (B) \$213 (C) \$223.30 (D) \$232 (E) None of the above.

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15. On a certain math test with 50 problems students earn two points for each correct answer and lose half a point for every question they get incorrect or leave blank. If Amy scored 70 on the test how many questions did she answer correctly?

    (A) 38 (B) 35 (C) 42 (D) 20 (E) None of the above.

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16. If $\dfrac{1}{3-x} = \dfrac{2}{9}$, then what is x?

    (A) $-3/2$ (B) $3/2$ (C) $2/3$ (D) $-2/3$ (E) None of the above.

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17. Which is bigger $(1/3)^{30}$ or $(3)^{1/30}$?

    (A) $(1/3)^{30}$ (B) $(3)^{1/30}$ (C) They are equal.

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18. Simplify the expression $x^{m-n}(x^{m+n}+x^n)$

    (A) x^{2m+n} (B) $x^{2m}+x^m$ (C) x^{2n+m} (D) x^{2m-n} (E) None of the above.

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19. On a highway trip a driver travels at 60 miles per hour for the first 100 miles and at 65 miles per hour for the second 100 miles. What is the average speed over the entire trip?

    (A) 64 mph (B) 125/2 mph (C) 312/5 mph (D) 63 mph (E) None of the above.

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20. The total number of distinct primes which divide 5040 is:

    (A) 2 (B) 3 (C) 4 (D) 5 (E) None of the above.

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21. Which of the following identities is known as the *distributive law*?
    (A) $a + b = b + a$ (B) $(a + b) + c = a + (b + c)$ (C) $(ab)c = a(bc)$
    (D) $a(b + c) = ab + ac$ (E) None of the above.

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22. Which of the following fractions is smallest?

    (A) $\frac{10}{63}$ (B) $\frac{11}{64}$ (C) $\frac{11}{63}$ (D) $\frac{10}{64}$ (E) $\frac{10}{60}$

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23. Which is the prime factorization of 31200?

    (A) $2^4 3^1 5^2 26^1$ (B) $2^5 5^2 39^1$ (C) $2^3 3^1 5^2 51^1$ (D) $2^3 3^2 5^2 17^1$ (E) None of the above.

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24. A jogger travels from point A to point B by running 3/4 of the way, walking 1/9 of the way and jogging the last 10 miles. What is the total distance the jogger travelled?

    (A) 36 mi (B) 45 mi (C) 56 mi (D) 72 mi (E) None of the above.
