Math Power

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School: _____ Grade:_____

AMC

1. If $\sqrt{.16x} = 2$, then $x =$ _____

2. In which can the 2's be cancelled out without changing the value of the expression?

   A) $2x - 2m$

   B) $\dfrac{\frac{x}{2}}{\frac{2}{m}}$

   C) $\dfrac{2x-m}{2}$

   D) $\dfrac{x^2}{m^2}$

   E) $\dfrac{\frac{2}{x}}{\frac{2}{m}}$

3. If $a = \frac{1}{2}$, $b = \frac{2}{3}$, and $c = \frac{3}{4}$, what is the value of $\dfrac{2a+3b}{c}$?

4. A circle has a circumference of c, what is its area?

5. $\dfrac{3a}{4b} = \dfrac{5b}{3c} = 1$. Find the value of $\dfrac{3a+4b}{2b+5c}$.

6. $3r - 2s = 0$, $\dfrac{9r^2}{s^2} =$ _____

7. What is the sum of $0.2 + 0.02 + 0.002 + \ldots + 0.000,000,000,002$

8. A vertical pole 6 feet high casts a shadow 4 feet long. At the same time a tree casts a shadow 64 feet long. What is the height, in feet, of the tree?

9. Alex, Barb, Cherry, Derek, Elisa, and Frank are six candidates running for chairperson and vice chairperson for the student government. The one who wins the highest vote will become the chairperson. The one who wins the second highest will become the vice chairperson. How many different outcomes can occur?

10. If a $3\frac{2}{3}$-pound box of candy costs $3.30, what is the price per pound of the candy in the box?

11. If a apples cost d dollars, how many apples can be bought for x dollars? (Express your answer in terms of $a, x,$ and d.)

12. The diameter of a hoop is 7. How many revolutions will it make if it is rolled a distance of 182π?

13. What is the average rate, in miles per hour, for a motorist who goes 2 miles in 3 minutes?

14. The figure below is not drawn to scale. Given AC = BC = BD = BE and $\angle 1 = x°$. Find the measure of $\angle 2$ in terms of x.
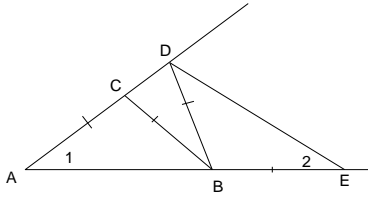
17. Solve: $\frac{1}{x} = \sqrt{0.25}$

18. Simplify: $\sqrt{248 + \sqrt{51 + \sqrt{169}}}$

15. Find the quadratic function
$$y = f(x)$$
which possesses -7 and 1 as its roots and passes through the point (-3, -10). Find the value of f at $x = 5$.

19. Solve: $4^x + 4^x = 1$

16. Simplify: $\sqrt{48} - \sqrt{27}$

20. Solve: $\sqrt{x} = 9\sqrt{2}$

21. Solve: $9^{x^3} = 729$

22. Solve: $\dfrac{1}{2} + \dfrac{1}{3} + \dfrac{1}{x} = \dfrac{1}{6}$

23. Simplify $\sqrt{\dfrac{16}{4 - \sqrt{15}}}$

24. Solve:
$4^{x+2} + 4^{x+5} = 130$

25. If a and b are positive integers, solve:
$\dfrac{1}{a} + \dfrac{1}{b} = \dfrac{1}{11}$.

26. Solve: $\sqrt[5]{x^3 + 5} = 2$

27. Simplify: $\dfrac{20^{10}}{40^5}$

28. Simplify: $\sqrt{5\sqrt{5}} = 25^x$

29. Simplify: $\sqrt[3]{7^7 \times 7^9 \times 7^{11}}$

33. Solve: $64^x = \sqrt{16\sqrt{8}}$

30. Simplify $\sqrt{3^7 + 3^7 + 3^7}$

34. Solve: $2^x \cdot 3^x = 36^{x-3}$

31. Solve: $8^x + 8^x + 8^x = 12288$

35. If $4x + 3y = 5$, then $16^x \times 8^y = ?$

32. Simplify: $8^{8^{3^{-1}}}$

36. If $3x - 4y = 2$, then $\dfrac{8^x}{4^{2y}} = ?$

37. Solve: $(x - 1)^x = 1024$

41. $\sqrt{77^2 + 77 + 78}$

    [Hint: $A^2 + 2A + 1 = (A + 1)^2$]

38. Solve: $2^x = x^{32}$

42. Solve: $\dfrac{53!}{52! + x!} = 52$

39. Give the system of equations below:

    $f(x) = -x + 2$
    $g(x) = x^2 - 1$

    If P(a, b) is one point of intersections, which of the following MUST be true?

    A) $a > 0$
    B) $a < 0$
    C) $b > 0$
    D) $b < 0$

43. Given

    $a + b + c = 37$
    $a \times b \times c = 1683$

    where a, b, and c are integers < 20.
    Find the values for a, b, and c.

44. m and n are integers:

    $3^m - 2^n = 115$

    $m + n = 12$

    $m \times n = ?$

40. $\dfrac{x^2 - 9}{5x^3 y^3} \div \dfrac{x - 3}{10x^5 y^4} =$

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45. Simplify: $\left(\sqrt[4]{\sqrt{3\sqrt[5]{16}}}\right)^{\sqrt[20]{8^{13}}} =$

46. A circle has an area of a^2 ($a > 0$) what is its circumference?

47. Simplify the sum of $1+r+r^2 + r^3 + \ldots + r^n$.

    Hint: $(1-r)(1+r+r^2+\ldots+r^n) = ?$

48. If $5^{0.03} = a$, express $5^{1.3}$ in terms of a.

49. Given that $3a = 4b = 5c$, what is the simplest ratio of $a:b:c$ in integers?

50. $\frac{y}{s-t} = \frac{s+t}{t-s}$, $y = $ _____

51. Solve the system of linear equations:
    $a_1x + b_1y = c_1$ and $a_2x + b_2y = c_2$
    Express your answer in terms of a_i, b_i, c_i, where $i = 1, 2$.

52. Given that $7x - 5y = 13$ and $2x - 7y = 26$. Find the value for $5x + 2y$.

Question set [**53 - 55**]

The ratio of the sides of two cubes is in 2:3.

53. If the total length of the edges of the smaller is 40 in. What is the length of the total length of the larger one?

54. If the total surface area of the larger is 36 in^2, what is the total surface area of the smaller one?

55. If the total volume of the two cubes is 140 cm^3. What is the volume of the smaller one?

56. Mary Lewis is paid $560 for a regular 35-hour week. Up to 40 hours she is paid at the regular hourly rate. For overtime more than 40 hours she receives $1\frac{1}{2}$ times as much as the regular hourly rate. How many hours did she work during a particular week when she earned $880?

57. The annual interest rate of a certain bank is r. The interest multiplies every month. What is the yield of a deposit of m dollars after two years?

58. A dietician has sufficient milk to feed 13 infants for 4 weeks. How many days will this supply last if 13 more infants are added?

59. Simplify $\sqrt{x^2y^2 - 2xy^2 + y^2}$

60. If 6 men can clear the snow near a school in 8 hours, how many hours will it take 12 men working at the same rate to perform this task?