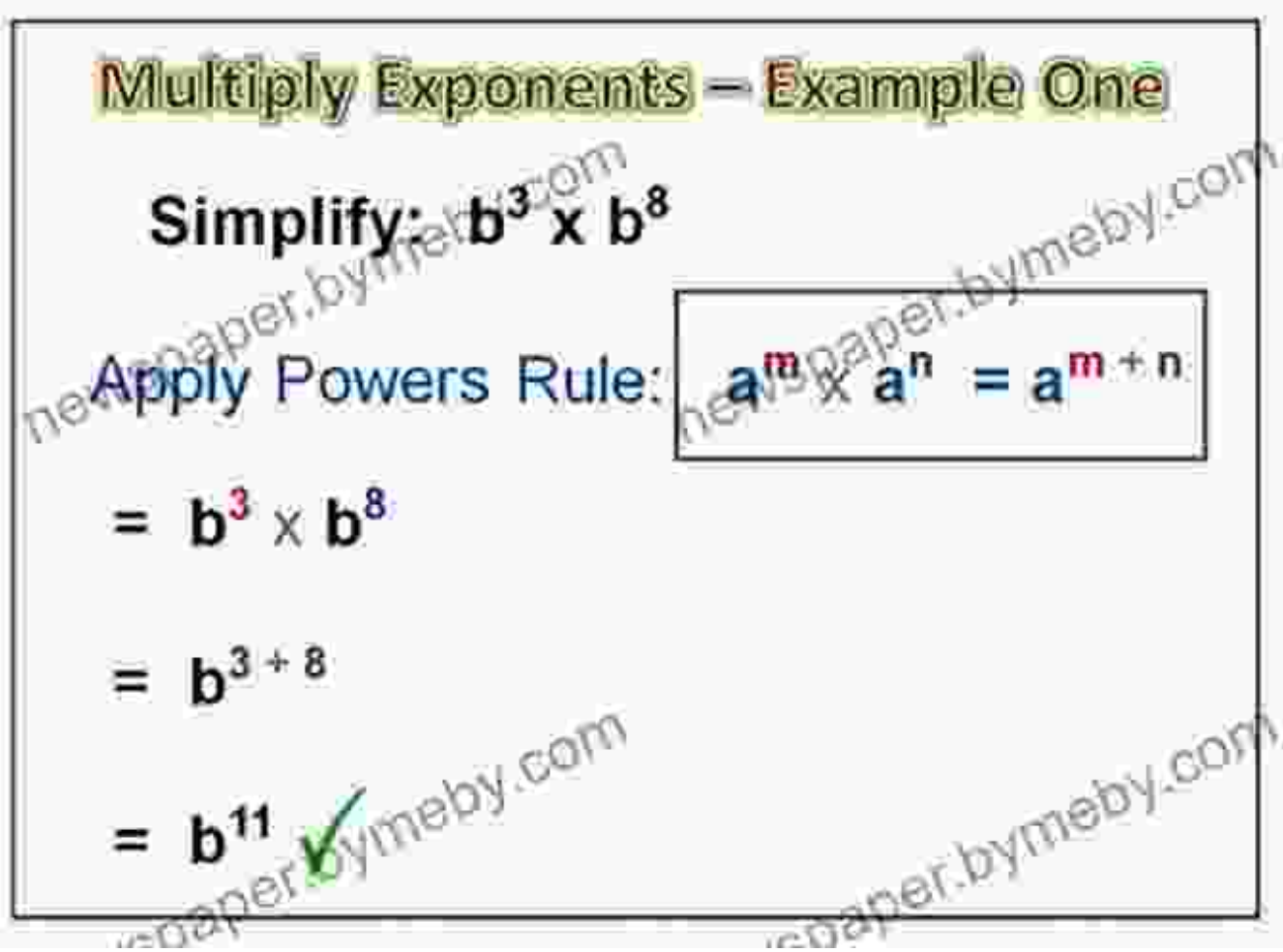
10 Must-Do Exponent Questions for GMAT DS: Mastering Quantitative Reasoning

Embark on a journey to conquer the intricacies of exponents in GMAT's Quantitative Reasoning section with our meticulously curated list of 10 must-do questions. These challenges will not only sharpen your problem-solving abilities but also propel you towards a stellar GMAT score. Dive into the realm of exponents and unlock the secrets of advanced mathematics.

Question 1: Exponents and Multiplication



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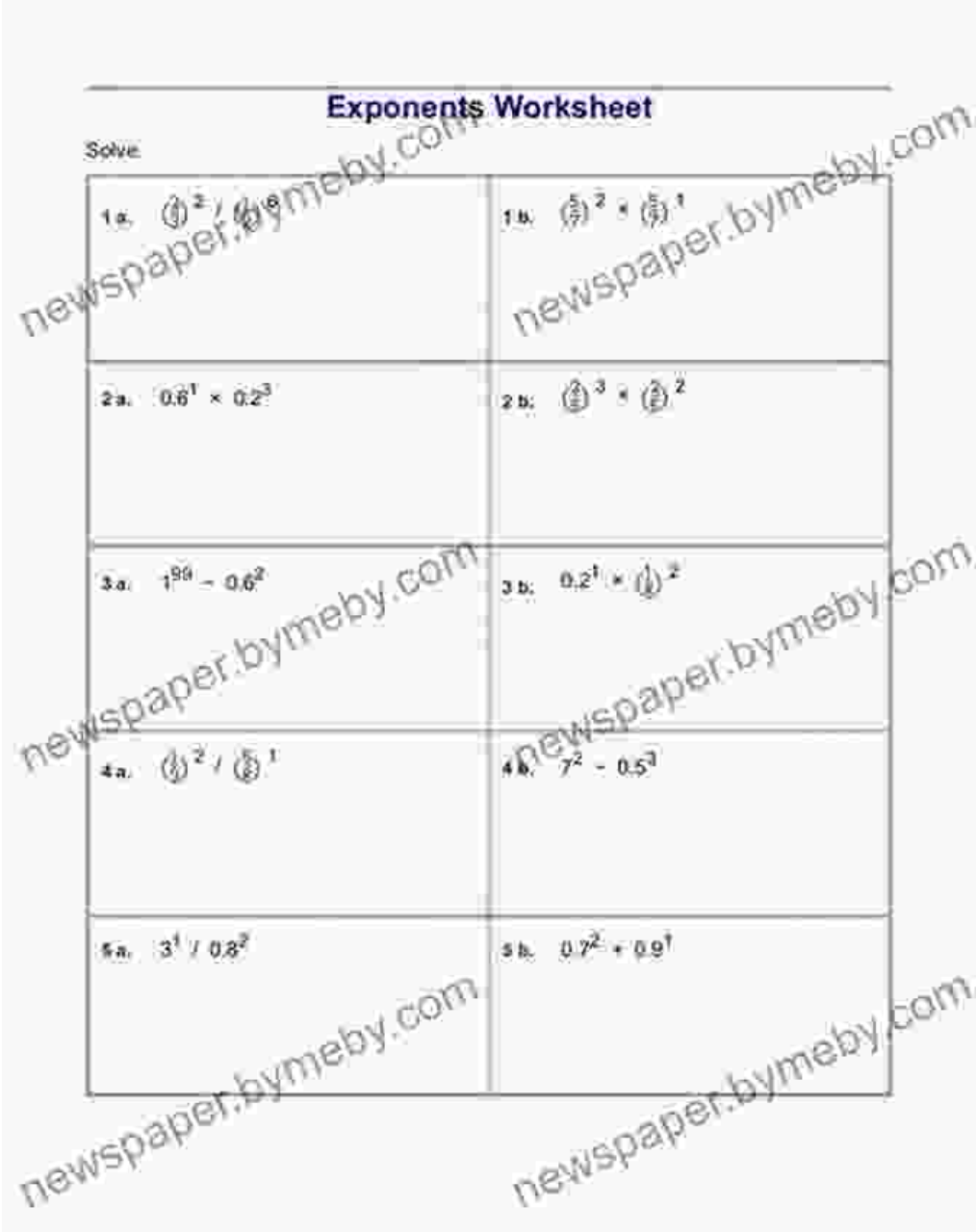
Solve for x: $2^x * 2^5 = 2^{12}$

Solution: Combine the exponents when multiplying terms with the same base. $2^x * 2^5 = 2^{x+5} = 2^{12}$. Therefore, x = 12 - 5 = 7.

Question 2: Exponents and Division



Simplify: $(3^4)^2 / 3^6$

Solution: Apply the exponent rule $(a^b)^c = a^{b*c}$. $(3^4)^2 = 3^{4*2} = 3^8$. Divide by 3^6 to get $3^8 / 3^6 = 3^{8-6} = 3^2 = 9$.

Question 3: Exponents and Powers of Powers

41. One million = 10^7

42. One hour = 60^2 seconds

43. $1^0 \times 0^1 = 1$

44. $(-3)^4 = -12$

45. $3^4 > 4^3$

46. $\frac{-3}{5}^{100} = \frac{-3^{100}}{-5^{100}}$

47. $(10 + 10)^{10} = 10^{10} + 10^{10}$

48. $x^0 \times x^0 = x^0 \div x^0$ is true for all non-zero values of x.

49. In the standard form, a large number can be expressed as a decimal number between 0 and 1, multiplied by a power of 10.

50. 4^3 is greater than 2^4.

51. $x^m + x^m = x^{2m}$, where x is a non-zero rational number and m is a positive integer.

52. $x^m \times y^m = (x \times y)^{2m}$, where x and y are non-zero rational numbers and m is a positive integer.

53. $x^m \div y^m = (x \div y)^m$, where x and y are non-zero rational numbers and m is a positive integer.

54. $x^m \times x^n = x^{m+n}$, where x is a non-zero rational number and m,n are positive integers.

55. 4^0 is greater than 16^0.

56. $\left(\frac{2}{5}\right)^3 \div \left(\frac{5}{2}\right)^3 = 1$

57. $\left(\frac{4}{3}\right)^5 \times \left(\frac{5}{7}\right)^5 = \left(\frac{4}{3} + \frac{5}{7}\right)^5$

58. $\left(\frac{5}{8}\right)^9 \div \left(\frac{5}{8}\right)^4 = \left(\frac{5}{8}\right)^4$

59. $\left(\frac{7}{3}\right)^2 \times \left(\frac{7}{3}\right)^5 = \left(\frac{7}{3}\right)^{10}$

60. $5^0 \times 25^0 \times 125^0 = (5^0)^6$

61. $876543 = 8 \times 10^5 + 7 \times 10^4 + 6 \times 10^3 + 5 \times 10^2 + 4 \times 10^1 + 3 \times 10^0$

62. $600060 = 6 \times 10^5 + 6 \times 10^2$

63. $4 \times 10^5 + 3 \times 10^4 + 2 \times 10^3 + 1 \times 10^0 = 432010$

64. $8 \times 10^6 + 2 \times 10^4 + 5 \times 10^2 + 9 \times 10^0 = 8020509$

65. $4^0 + 5^0 + 6^0 = (4 + 5 + 6)^0$

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Evaluate: $(2^3)^4$

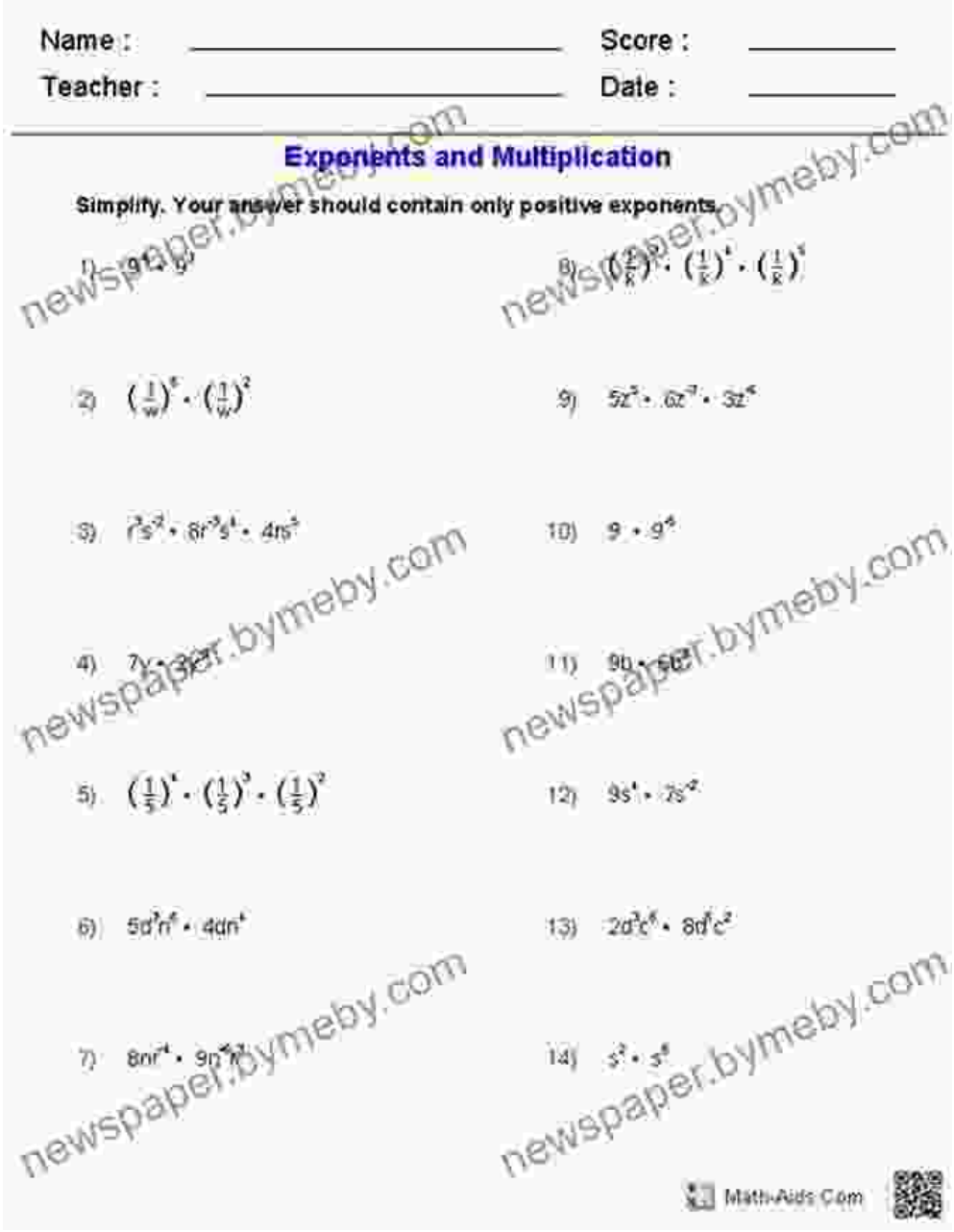
Solution: Multiply the exponents when raising a power to another power. $(2^3)^4 = 2^{3*4} = 2^{12} = 4096$.

Question 4: Exponents and Zero Exponents

Solve for x: $5^x = 1$

Solution: Any number raised to the power of 0 equals 1. Therefore, x = 0.

Question 5: Exponents and Negative Exponents



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Exponents and Multiplication

Simplify. Your answer should contain only positive exponents.

1) $9^2 \cdot 9^3$

2) $\left(\frac{1}{w}\right)^5 \cdot \left(\frac{1}{w}\right)^2$

3) $r^3s^{-2} \cdot 8r^{-3}s^4 \cdot 4rs^{-3}$

4) $7y \cdot 3x^{-2}y^7$

5) $\left(\frac{1}{5}\right)^4 \cdot \left(\frac{1}{5}\right)^3 \cdot \left(\frac{1}{5}\right)^2$

6) $5d^3n^6 \cdot 4dn^4$

7) $8nr^{-4} \cdot 9n^{-4}r^7$

8) $\left(\frac{2}{k}\right)^3 \cdot \left(\frac{1}{k}\right)^4 \cdot \left(\frac{1}{k}\right)^5$

9) $5z^3 \cdot 6z^{-7} \cdot 3z^{-6}$

10) $9 \cdot 9^{-5}$

11) $9b \cdot 5b^2$

12) $8s^4 \cdot 7s^{-2}$

13) $2d^2c^{-5} \cdot 8d^5c^2$

14) $s^3 \cdot s^8$

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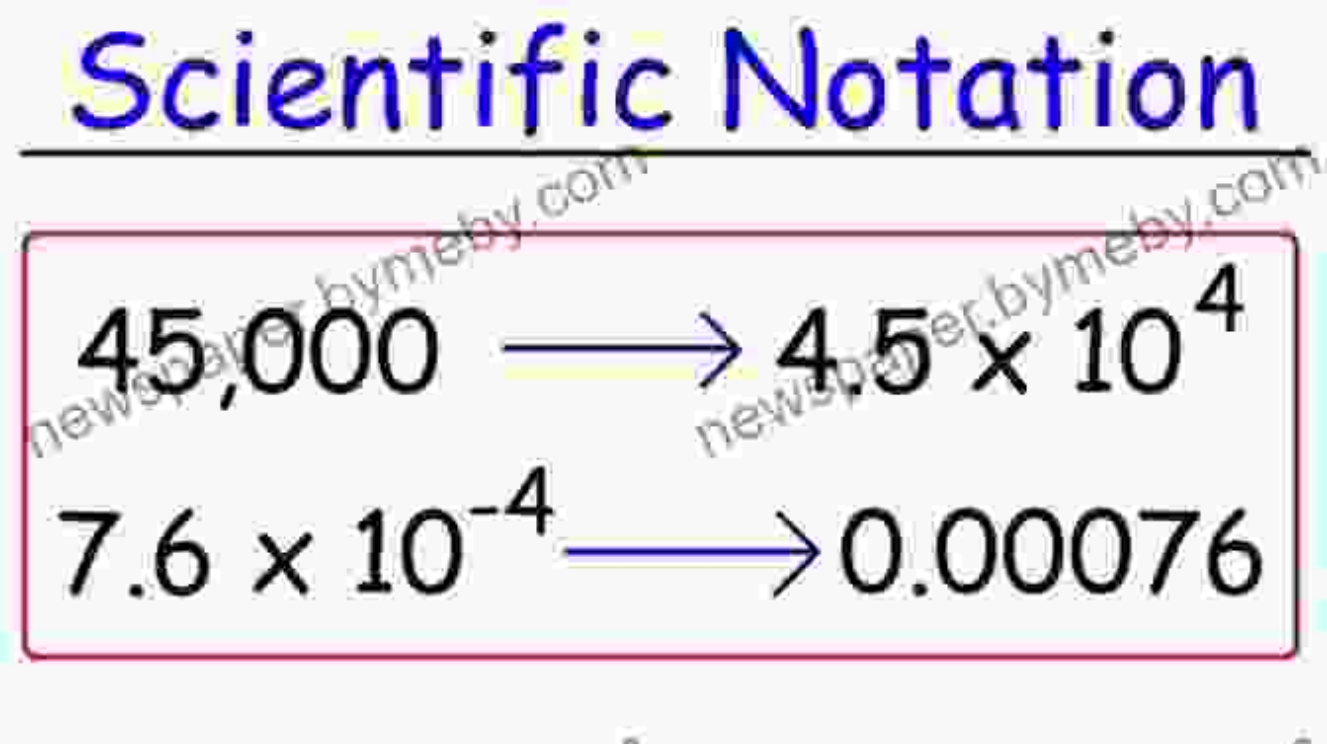
Simplify: 2^{-3}

Solution: A negative exponent indicates the reciprocal of the base raised to the positive exponent. $2^{-3} = 1/2^3 = 1/8$.

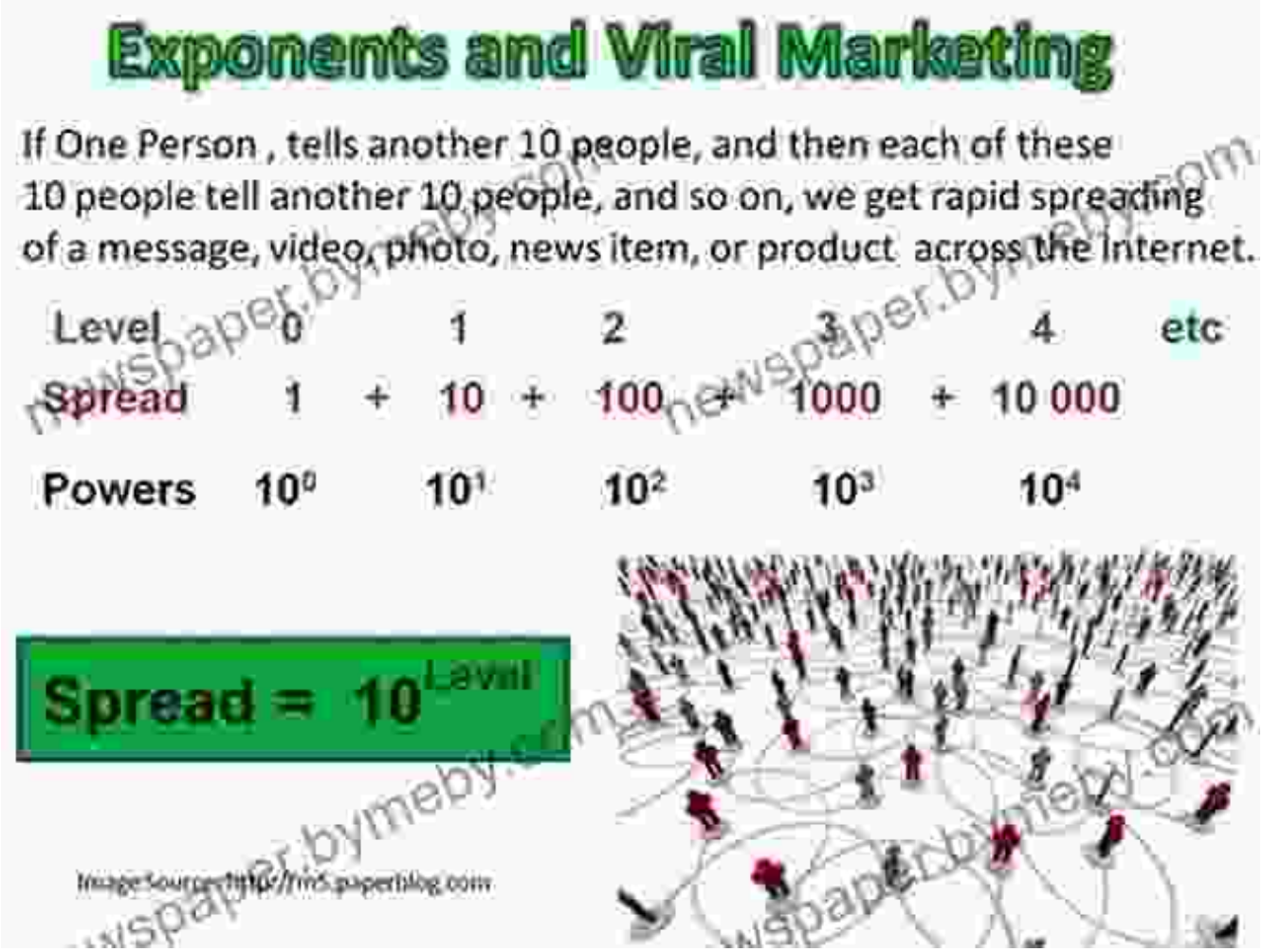
Question 6: Exponents and Scientific Notation



Express 0.000005 in scientific notation.

Solution: Move the decimal point 6 places to the right and adjust the exponent accordingly. $0.000005 = 5 * 10^{-6}$.

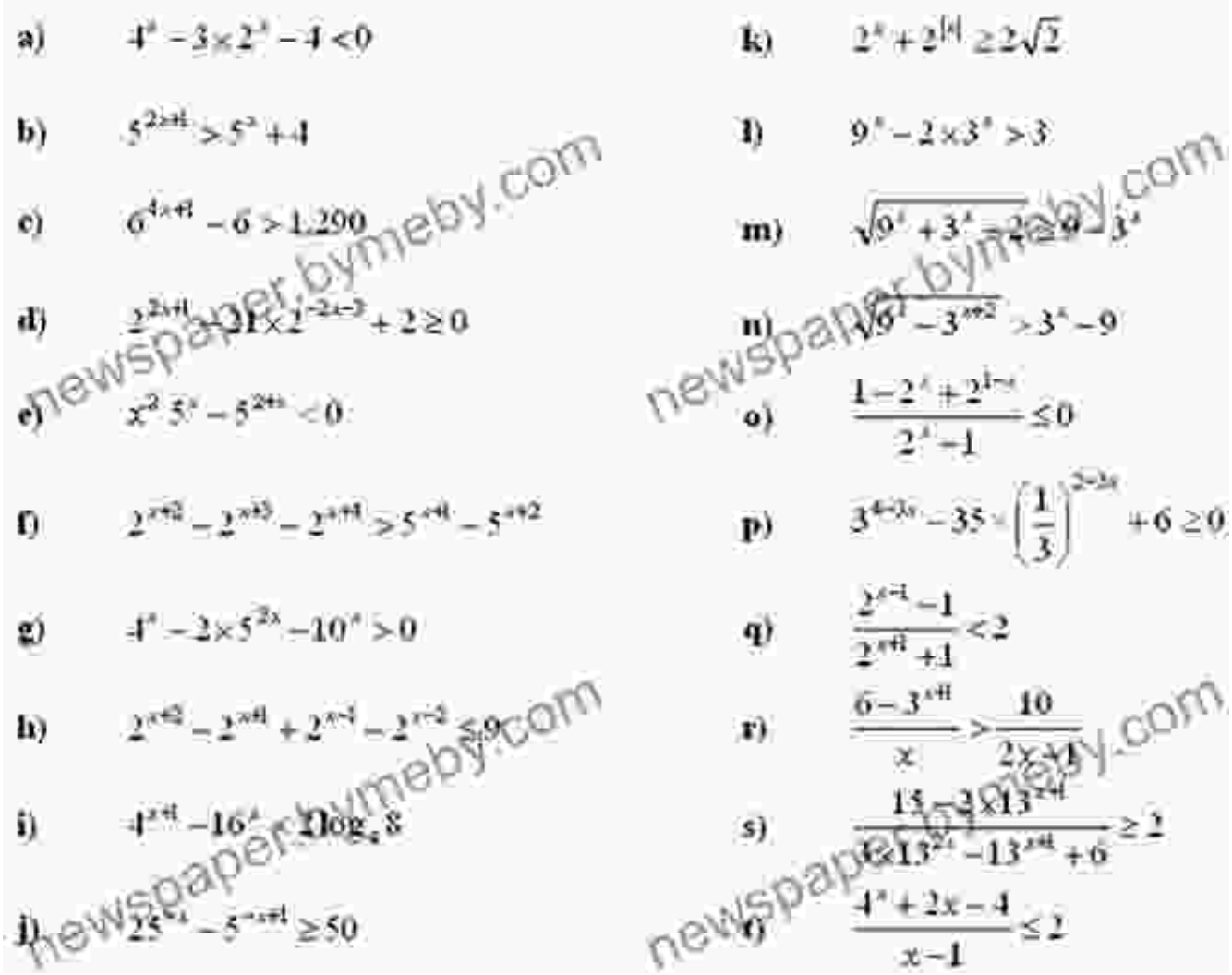
Question 7: Exponents in Real-World Applications



A population of bacteria grows exponentially, doubling every hour. If there are initially 100 bacteria, how many bacteria will there be after 5 hours?

Solution: The growth pattern can be represented by the equation $P = 100 * 2^h$, where P is the population size and h is the number of hours. After 5 hours, $P = 100 * 2^5 = 3200$ bacteria.

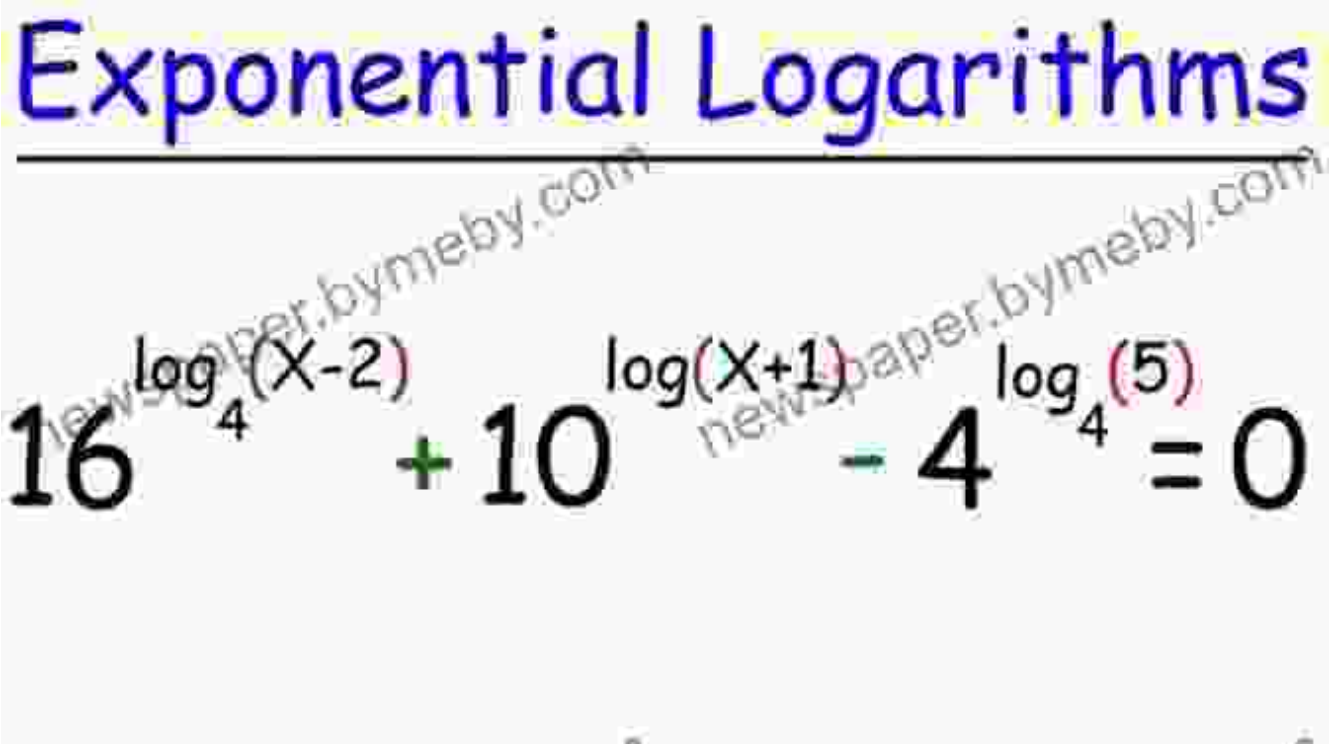
Question 8: Exponents and Inequalities



Solve the inequality: $3^x < 27$

Solution: Rewrite 27 as 3^3 and compare the exponents. $x < 3$.

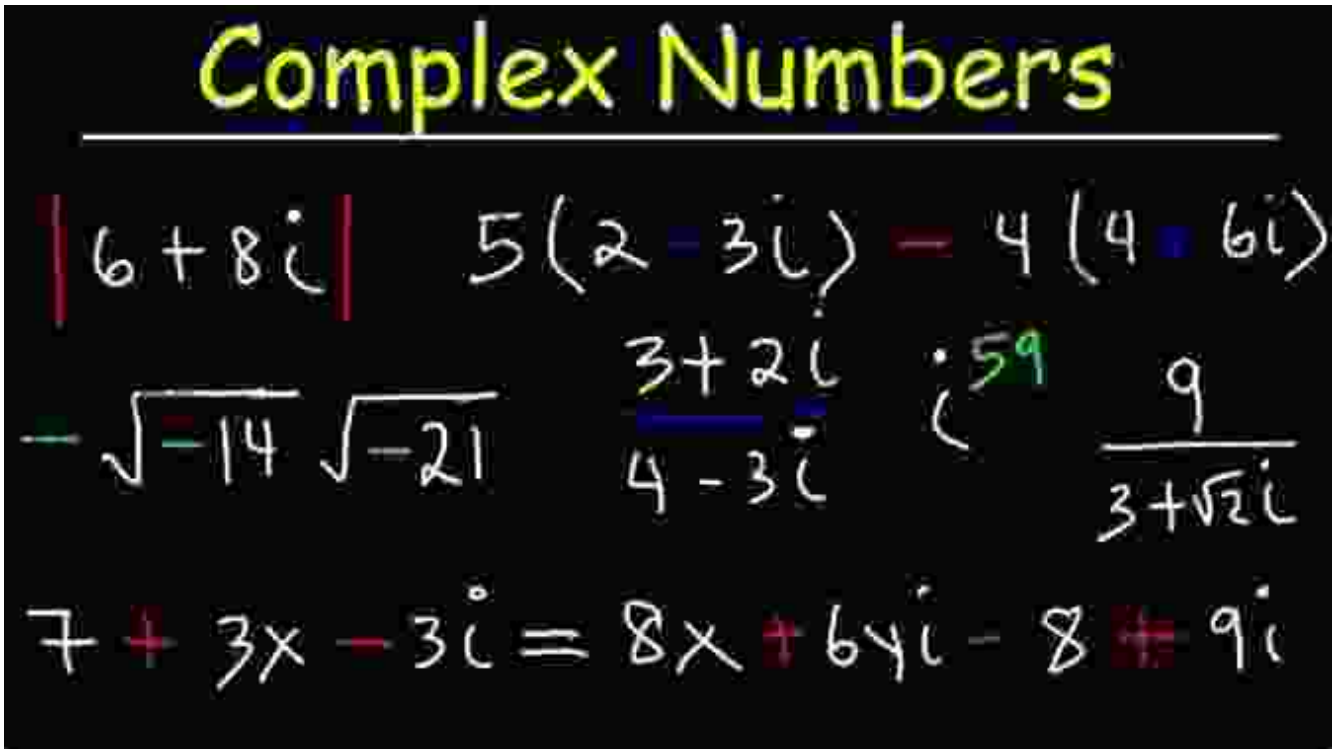
Question 9: Exponents and Logarithms



Find the value of $\log_3 81$.

Solution: The logarithm is the exponent to which the base must be raised to get the given number. $\log_3 81 = 4$ because $3^4 = 81$.

Question 10: Exponents and Complex Numbers



Simplify: $(\sqrt{-1})^6$

Solution: $(-1)^6 = 1$ and $\sqrt{-1}$ represents the imaginary unit i. Therefore, $(\sqrt{-1})^6 = i^6 = i^4 * i^2 = 1 * (-1) = -1$.

Mastering exponents is a cornerstone of success in GMAT's Quantitative Reasoning section. These 10 must-do questions provide a comprehensive foundation, equipping you with the knowledge and problem-solving skills to tackle even the most challenging exponent-related problems. Practice diligently, seek guidance from experts, and embrace the power of exponents to unlock your full potential on GMAT DS.

Additional Resources

- Official GMAT Website
- MBA.com: GMAT Preparation

- Kaplan Test Prep: GMAT Resources
- The Princeton Review: GMAT Study Plan

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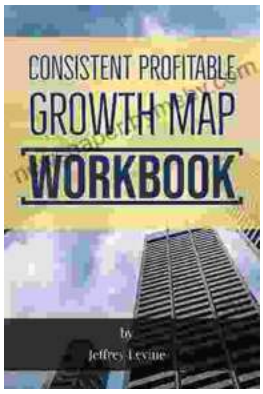

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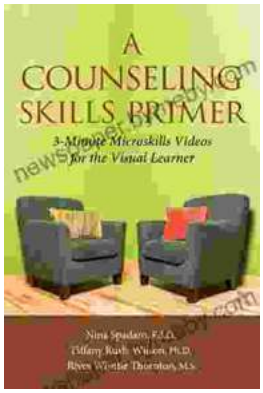

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