

# Exponential Functions Test With Answers

Exponential Functions Test With Answers Exponential Functions Test with Answers This test covers various aspects of exponential functions ranging from basic definitions to more complex applications It is designed for students taking an Algebra II or Precalculus course I Multiple Choice 2 points each 20 points total 1 Definition of Exponential Function Which of the following is the general form of an exponential function a  $f(x) = ax$  b  $f(x) = bx$  c  $f(x) = abx$  d  $f(x) = ax$  Answer c  $f(x) = abx$  2 Identifying Exponential Functions Which of the following is an exponential function a  $y = 2x + 1$  b  $y = 3x$  c  $y = x^2$  d  $y = x$  Answer b  $y = 3x$  3 Growth/Decay If the base of an exponential function is greater than 1 the function represents a Exponential growth b Exponential decay c Linear growth d Linear decay Answer a Exponential growth 4 Graphing Exponential Functions The graph of the exponential function  $f(x) = 2^x$  passes through which point a 0 0 b 1 c 12 d 21 Answer c 12 5 Transformations The graph of  $y = 2x + 3$  is a translation of the graph of  $y = 2x$  a 3 units to the right b 3 units to the left c 3 units up d 3 units down Answer a 3 units to the right 6 Solving Exponential Equations What is the solution to the equation  $4^x = 16$  a  $x = 2$  b  $x = 4$  c  $x = 8$  d  $x = 16$  Answer a  $x = 2$  7 Logarithmic Form The logarithmic form of the exponential equation  $5^3 = 125$  is a  $\log 125 = 3$  b  $\log 125 = 5$  c  $\log 5 = 3$  d  $\log 3 = 5$  Answer a  $\log 125 = 3$  8 Evaluating Logarithms What is the value of  $\log 8$  a 2 b 3 c 4 d 8 Answer b  $3$  9 Properties of Logarithms Which of the following is NOT a property of logarithms 3 a  $\log b = c$  b  $\log b \log c = \log bc$  c  $\log b \log c = \log(b + c)$  d  $\log b \log c = \log(b \cdot c)$  if and only if b c Answer d  $\log b \log c = \log(b \cdot c)$  if and only if b c 10 Solving Logarithmic Equations What is the solution to the equation  $\log x = 2$  a  $x = 1$  b  $x = 7$  c  $x = 9$  d  $x = 11$  Answer b  $x = 7$  II Short Answer 3 points each 15 points total 1 Writing Exponential Equations Write the exponential function that represents the growth of a population that doubles every 5 years starting with an initial population of 1000 2 Graphing Exponential Functions Sketch the graph of the function  $f(x) = 2^x$  Label at least two points on the graph 3 Solving Exponential Equations Solve the equation  $5^x = 25$  4 Solving Logarithmic Equations Solve the equation  $\log x = 3$  4 5 Applications The value of a car depreciates exponentially If the initial value was 25000 and it depreciates at a rate of 10 per year what will be the cars value after 5 years III Problem Solving 5 points each 25 points total 1 Compound Interest If 1000 is invested at an annual interest rate of 5 compounded monthly how much money will be in the account after 10 years 2 Population Growth The population of a town is growing exponentially If the population was 10000 in 2000 and 15000 in 2010 what will be the population in 2020 4 3 Radioactive Decay The halflife of a radioactive substance is 10 years If you start with 100 grams of the substance how much will be left after 30 years 4 Solving Exponential Inequalities Solve the inequality  $3^x > 9$  5 Logarithmic Transformation The intensity of sound is measured in decibels dB The formula for the intensity level in decibels is given by  $L = 10 \log \frac{I}{I_0}$  where  $I$  is the intensity of the sound and  $I_0$  is the reference intensity If the intensity of a sound increases by a factor of 10 by how many decibels does the intensity level increase IV Bonus 5 points Prove the following logarithmic property  $\log bc = \log b + \log c$  Answer Key This answer key provides solutions and explanations for each problem It allows students to check their work and understand the concepts tested I Multiple Choice 1 c  $f(x) = abx$  This is the general form of an exponential function where  $a$  is the initial value and  $b$  is the base 2 b  $y = 3x$  This function has a variable in the exponent which is the defining characteristic of exponential functions 3 a Exponential growth When the base is greater than 1 the function grows rapidly as  $x$  increases 4 c 1 2 Substituting  $x = 1$  into the function  $f(x) = 2^x$  gives us  $f(1) = 2$  5 a 3 units to the right The term  $x^3$  inside the exponent shifts the graph 3 units to the right 6 a  $x = 2$  Since  $4^1 = 16$  7 a  $\log 125 = 3$  This is the logarithmic form of the exponential equation 8 b 3 Since  $2^3 = 8$  9 d  $\log b = \log c$  if and only if  $b = c$  This statement is not true as  $\log b = \log c$  if and only if  $b = c$  10 b  $x = 7$  Solving

for  $x$  in the equation  $\log x \geq 2$  gives us  $x \geq 10^2$  II Short Answer 5 1 ft 1000 2t5 The population doubles every 5 years so the base is 2 and the exponent is  $t/5$  2 Sketch The graph will pass through the points  $(0, 1)$  and  $(1, 12)$  It will have a horizontal asymptote at  $y = 0$  3  $x \geq 1$  Solving the equation  $5x = 125$  gives us  $x = 12.4$  4  $x = 19$  Solving the equation  $\log x \geq 4$  gives us  $x \geq 10^4$  5 Value 15000 The formula for exponential decay is  $V_t = V_0 e^{-rt}$  III Problem Solving 1 A 164701 Using the compound interest formula  $A = P(1 + r)^t$  2 Population 22500 Using the exponential growth formula  $P_t = P_0 e^{kt}$  3 Amount 125 grams Using the formula for radioactive decay  $N_t = N_0 e^{-kt}$  4  $x = 2$  Solving the inequality  $3x \geq 19$  gives us  $x \geq 12.4$  5 Intensity level increases by 10 dB The intensity level increases by 10 dB for every factor of 10 increase in intensity IV Bonus Proof Let  $y = \log_b c$  Then  $a^y = c$  Multiply both sides by  $a$   $a^y a = c a$  Take the logarithm base  $a$  of both sides  $\log_a a^y = \log_a c$   $y = \log_a c$  Using the property  $\log_b c = \log_a c / \log_a b$   $\log_b c = \log_a c / \log_a b$  Since  $\log_a a = 1$   $y = \log_a c$   $y = \log_a c$  Therefore  $y = \log_b c$  Since  $y = \log_b c$  we have proven that  $\log_b c = \log_a c / \log_a b$  This comprehensive test provides a thorough assessment of students' understanding of exponential functions, their properties, and various applications. The inclusion of answers and detailed explanations fosters self-learning and reinforces key concepts.

Quantitative Examination of Neurologic Functions: Methodology for test and patient assessments and design of a computer-automated system Manual of Vital Function Testing Methods and Their Interpretation Theory of Functions of a Complex Variable Essays in Hypothesis Testing with Instrumental Variables Manual of mental and physical tests v.1, 1914 An Examination of the Relationship Between Executive Functions and Restricted, Repetitive Symptoms in High-functioning Individuals with Autism The Theory of Linear Models and Multivariate Analysis The Lancet Prognosis Tests in the Modern Foreign Languages Lectures on the Theory of Functions of Real Variables The theory of functions of a real variable and the theory of Basic Medical-surgical Nursing Dominion Law Reports Pract. Bact., Blood Work and Animal Parasitology Lectures on the Theory of Functions of Real Variables: Point sets and proper integrals AGARD Report Proceedings The American Journal of Clinical Nutrition Advances in Superconductivity VIII College Algebra Alfred R. Potvin Wilfred Mason Barton Forsyth Andrés Santos Guy Montrose Whipple Brian Russell Lopez Steven F. Arnold Vivian Allen Charles Henmon James Pierpont Ernest William Hobson Mildred A. Mason Stitt James Pierpont Hisao Hayakawa Larson Quantitative Examination of Neurologic Functions: Methodology for test and patient assessments and design of a computer-automated system Manual of Vital Function Testing Methods and Their Interpretation Theory of Functions of a Complex Variable Essays in Hypothesis Testing with Instrumental Variables Manual of mental and physical tests v.1, 1914 An Examination of the Relationship Between Executive Functions and Restricted, Repetitive Symptoms in High-functioning Individuals with Autism The Theory of Linear Models and Multivariate Analysis The Lancet Prognosis Tests in the Modern Foreign Languages Lectures on the Theory of Functions of Real Variables The theory of functions of a real variable and the theory of Basic Medical-surgical Nursing Dominion Law Reports Pract. Bact., Blood Work and Animal Parasitology Lectures on the Theory of Functions of Real Variables: Point sets and proper integrals AGARD Report Proceedings The American Journal of Clinical Nutrition Advances in Superconductivity VIII College Algebra Alfred R. Potvin Wilfred Mason Barton Forsyth Andrés Santos Guy Montrose Whipple Brian Russell Lopez Steven F. Arnold Vivian Allen Charles Henmon James Pierpont Ernest William Hobson Mildred A. Mason Stitt James Pierpont Hisao Hayakawa Larson

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