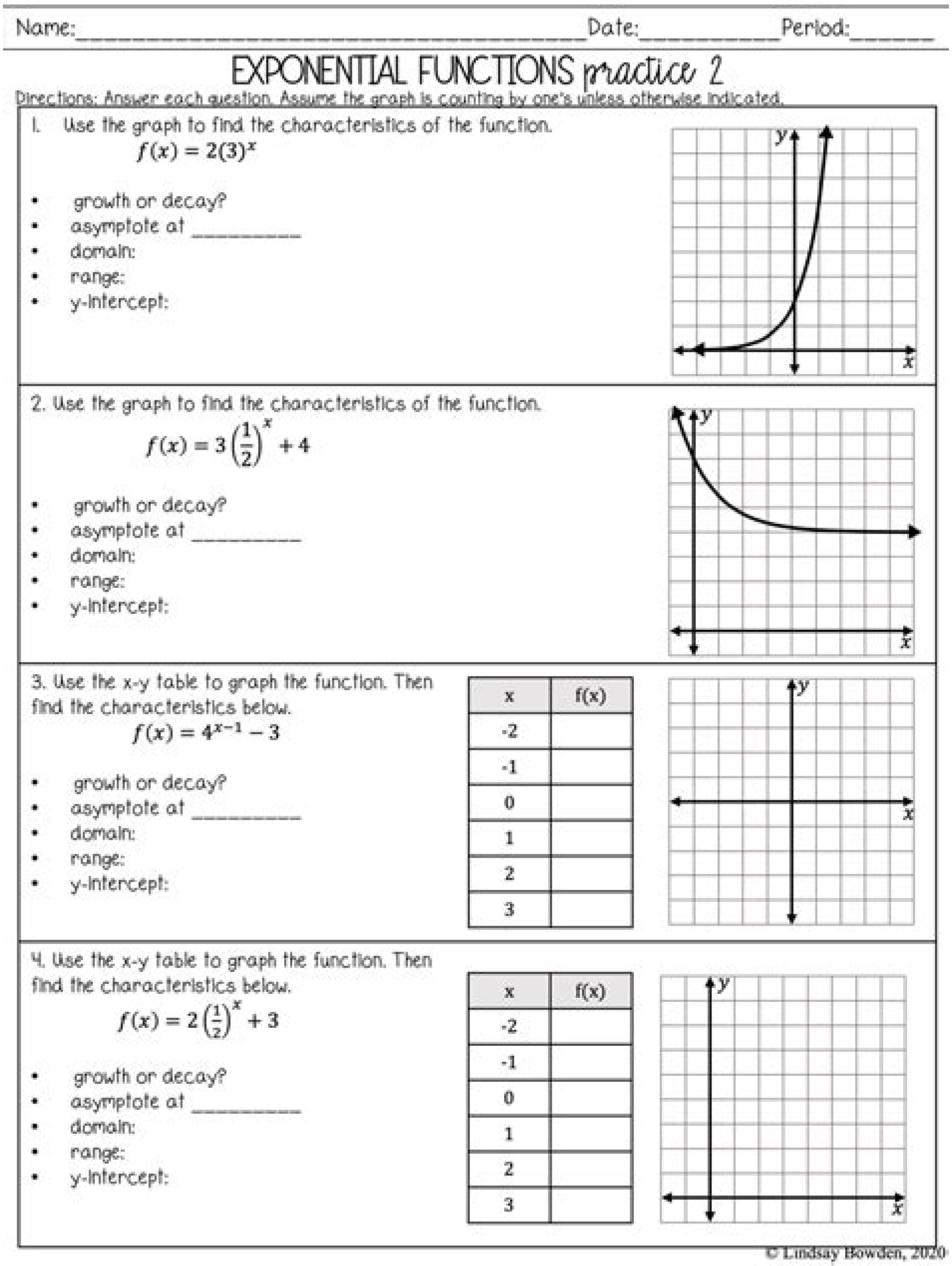
Exponential Function Practice Problems



Name:______________________________________Date:__________Period:______

EXPONENTIAL FUNCTIONS *practice 2*

Directions: Answer each question. Assume the graph is counting by one's unless otherwise indicated.

1. Use the graph to find the characteristics of the function.
$f(x) = 2(3)^x$
- growth or decay?
- asymptote at __________
- domain:
- range:
- y-intercept:

2. Use the graph to find the characteristics of the function.
$f(x) = 3\left(\frac{1}{2}\right)^x + 4$
- growth or decay?
- asymptote at __________
- domain:
- range:
- y-intercept:

3. Use the x-y table to graph the function. Then find the characteristics below.
$f(x) = 4^{x-1} - 3$
- growth or decay?
- asymptote at __________
- domain:
- range:
- y-intercept:

x	f(x)
-2	
-1	
0	
1	
2	
3	

4. Use the x-y table to graph the function. Then find the characteristics below.
$f(x) = 2\left(\frac{1}{2}\right)^x + 3$
- growth or decay?
- asymptote at __________
- domain:
- range:
- y-intercept:

x	f(x)
-2	
-1	
0	
1	
2	
3	

Exponential function practice problems are essential for students to grasp the concept of exponential growth and decay, which have real-world applications in fields such as biology, finance, and physics. Understanding exponential functions allows students to analyze and model situations involving rapid change. In this article, we will explore the fundamentals of exponential functions, provide practice problems, and offer detailed solutions to enhance your learning experience.

Understanding Exponential Functions

Exponential functions are mathematical functions of the form:

$$ f(x) = a \cdot b^x $$

where:

- a is a constant (the initial value),
- b is the base of the exponential (a positive constant),
- x is the exponent.

The most common base for exponential functions is e (approximately equal to 2.718), especially in continuous growth scenarios. Exponential functions exhibit unique properties:

- Growth: If $b > 1$, the function represents exponential growth.
- Decay: If $0 < b < 1$, the function represents exponential decay.

Characteristics of Exponential Functions

1. Domain and Range:

- The domain of exponential functions is all real numbers $(-\infty, \infty)$.
- The range is always positive, $(0, \infty)$.

2. Intercepts:

- Exponential functions always pass through the point $(0, a)$ because $b^0 = 1$.

3. Asymptotes:

- The horizontal asymptote of an exponential function is the x-axis, $y = 0$.

4. Behavior:

- As x approaches $+\infty$, $f(x)$ approaches $+\infty$ (for growth).
- As x approaches $-\infty$, $f(x)$ approaches 0.

Understanding these characteristics is crucial for solving exponential function problems effectively.

Practice Problems

To solidify your understanding, here are some exponential function practice problems across various difficulty levels.

Basic Problems

1. Evaluate $f(x) = 2^x$ at $x = 3$.
2. Find the value of $f(x) = 5 \cdot 3^x$ when $x = 2$.
3. Determine the y-intercept of the function $g(x) = 4 \cdot (0.5)^x$.

Intermediate Problems

4. Solve the equation $3^x = 81$.
5. A population of bacteria doubles every 3 hours. If the initial population is 500, write an equation representing the population after t hours and calculate the population after 9 hours.
6. Find the value of x in the equation $2^{x+1} = 16$.

Advanced Problems

7. An investment of $1,000 is made in an account that earns 5% interest compounded annually. Write an exponential function for the value of the investment after t years and calculate the value after 10 years.
8. The half-life of a substance is 10 years. If you start with 100 grams, write an equation to model the amount remaining after t years and determine how much will remain after 30 years.
9. Solve the exponential equation $5^{x-2} = 25 \cdot 5^x$.

Solutions to Practice Problems

Let's go through the solutions to the practice problems step by step.

Basic Problems Solutions

1. Evaluate $f(x) = 2^x$ at $x = 3$.

- $f(3) = 2^3 = 8$.

2. Find the value of $f(x) = 5 \cdot 3^x$ when $x = 2$.

- $f(2) = 5 \cdot 3^2 = 5 \cdot 9 = 45$.

3. Determine the y-intercept of the function $g(x) = 4 \cdot (0.5)^x$.

- The y-intercept occurs when $x = 0$.
- $g(0) = 4 \cdot (0.5)^0 = 4 \cdot 1 = 4$.

Intermediate Problems Solutions

4. Solve the equation $3^x = 81$.

- Rewrite 81 as 3^4.
- Therefore, $3^x = 3^4$ implies $x = 4$.

5. Population doubling problem.

- The equation is given by $P(t) = 500 \cdot 2^{t/3}$.
- For $t = 9$: $P(9) = 500 \cdot 2^{9/3} = 500 \cdot 2^3 = 500 \cdot 8 = 4000$.
- The population after 9 hours is 4000.

6. Find the value of x in the equation $2^{x+1} = 16$.

- Rewrite 16 as 2^4.
- Thus, $2^{x+1} = 2^4$ implies $x + 1 = 4$ or $x = 3$.

Advanced Problems Solutions

7. Investment problem.

- The equation is $A(t) = 1000 \cdot (1.05)^t$.
- For $t = 10$: $A(10) = 1000 \cdot (1.05)^{10} \approx 1000 \cdot 1.62889 \approx 1628.89$.
- The value after 10 years is approximately $1628.89.

8. Half-life problem.

- The equation is $A(t) = 100 \cdot (0.5)^{t/10}$.
- For $t = 30$: $A(30) = 100 \cdot (0.5)^{30/10} = 100 \cdot (0.5)^3 = 100 \cdot \frac{1}{8} = 12.5$.
- After 30 years, 12.5 grams will remain.

9. Solve the exponential equation $5^{x-2} = 25 \cdot 5^x$.

- Rewrite 25 as 5^2: $5^{x-2} = 5^2 \cdot 5^x$.

- This simplifies to $5^{x-2} = 5^{x+2}$.
- Therefore, $x - 2 = x + 2$ leads to $-2 = 2$, which is a contradiction.
- Hence, no solution exists.

Conclusion

Exponential functions are foundational in mathematics and various scientific fields. Practicing problems allows students to apply their understanding and develop critical analytical skills. The problems presented in this article, along with their solutions, provide a comprehensive overview of how exponential functions operate in different scenarios. By mastering these concepts, students can gain confidence in tackling more complex mathematical challenges in the future.

Frequently Asked Questions

What is an exponential function?

An exponential function is a mathematical function of the form $f(x) = a b^x$, where 'a' is a constant, 'b' is the base of the exponential ($b > 0$), and 'x' is the exponent.

How do you solve an exponential equation?

To solve an exponential equation, you can take the logarithm of both sides to isolate the exponent. For example, if you have an equation like $b^x = c$, you can rewrite it as $x = \log_b(c)$.

What are some common applications of exponential functions?

Exponential functions are commonly used in various fields such as finance for compound interest calculations, in biology for population growth models, and in physics for radioactive decay.

How can I graph an exponential function?

To graph an exponential function, plot key points by substituting values for 'x' into the function f(x) = a b^x. The graph will show a rapid increase or decrease, depending on whether 'b' is greater than or less than 1.

What is the difference between exponential growth and decay?

Exponential growth occurs when the base 'b' in the function f(x) = a b^x is greater than 1, leading to rapid increases. Exponential decay occurs when 'b' is between 0 and 1, resulting in a rapid decrease over time.

What is the value of the exponential function at x=0?

For any exponential function of the form f(x) = a b^x, the value at x=0 is always f(0) = a b^0 = a, since any number raised to the power of 0 is 1.

Can you provide an example of a real-world exponential function problem?

Sure! If a population of bacteria doubles every hour, starting with 100 bacteria, the exponential function modeling this growth would be f(t) = 100 2^t, where 't' is the time in hours.

Exponential Function Practice Problems

Descargar Send files to TV APK Última Versión 1.3.8 para Android
Jul 1, 2025 · Descarga e instala la última versión de Send files to TV APK 1.3.8 para Android. Transfiere fácilmente archivos a tu Smart TV de Android desde tu móvil o computadora.

Send files to TV APK (Android App) - Descarga Gratis
Jun 21, 2025 · SFTTV es la forma más rápida y privada de enviar archivos a su televisor. SFTTV también se ejecuta en Windows, macOS y Linux. Los archivos se pueden transferir fácilmente …

Send files to TV APK para Android - Descargar - Softonic
La aplicación Send files to TV es una gran solución para todas las necesidades de transferencia de archivos. Sin requerir una conexión estable a Internet, permite enviar archivos entre …

Send files to TV para Android - Descargar gratis
La aplicación Enviar Archivos a TV es una aplicación gratuita para Android que te permite compartir archivos entre el teléfono y el televisor. Puedes hacerlo mediante dos métodos: …

Enviar todo tipo de archivos a tu Android TV desde el móvil o el ...
Jan 10, 2021 · Para enviar archivos a nuestro Android TV podremos utilizar diversos métodos en función de cuáles estén soportados por el propio dispositivo. La gran mayoría incluyen un …

Send files to TV for Android - Free App Download - AppBrain
3 days ago · Download Send files to TV for Android: a free tools app developed by Yablio with 10,000,000+ downloads. Easily transfer files to your Smart TV android from your mobile or...

Cómo instalar Send Files to TV en Smart TV Samsung
Si quieres enviar archivos fácilmente a tu televisor, la aplicación Send Files to TV es la solución perfecta. Con esta sencilla guía rápida, podrás instalar la app en cuestión de minutos y …

Cómo usar send files to tv (2025) ¿Cómo Usarlo? - Dudas y textos
Mar 1, 2025 · Con send files to tv, puedes disfrutar de tus videos caseros, álbumes de fotos o incluso realizar presentaciones de diapositivas para sorprender a tus amigos en una reunión.

Investment News | Nuoyan Capital Invested in SDrive Technology...
Jul 1, 2024 · SDrive's air suspension integrated eight-in-one SDS (One-Box) controller product has seized the window period of the air suspension market explosion in 2023, and is expected …

Shijia Technology has completed tens of millions of Pre-A rounds ...
Shijia Technology was established in 2021 and is mainly committed to R&D, production and sales of core components, hardware and software, and system solutions for air suspension systems. …

China’s air suspension solution provider SDRIVE closes Pre-A …
Dec 28, 2022 · Shanghai (Gasgoo)- Shanghai SDRIVE Technology Co., Ltd. ("SDRIVE"), a Chinese air suspension solution provider, recently announced it has closed the Pre-A round of …

sdrive-tech.com - □□□□|□□□□□□□
□□□□□□□□□□□□□□500□□□□□□□□□□□□□□□□□□□□□□□□□

Shijia Technology Completes 100-Million-Yuan Series A …
Jul 10, 2025 · 36Kr has learned that Shijia Technology Co., Ltd. (hereinafter referred to as "Shijia Technology"), a supplier of intelligent suspension systems, recently announced the completion …

Shijia Technology - 2025 Company Profile & Team - Tracxn
Jul 12, 2025 · Shijia Technology is a series A company based in Shanghai (China), founded in 2021 by Wu Weimin. It operates as a Manufacturer of automotive air suspension systems. …

Local companies are intensively deployed, and it is time for …
Image source: Shijia Technology As one of the earliest companies in China to develop the air suspension industry, Shijia Technology starts from software products, provides One-Box …

Shijia Technology - Crunchbase Company Profile & Funding
About the Company Shijia Technology mainly develops, produces, and sells core components, software hardware, and system solutions for air suspension systems and intends to become a …

In 2025, China's passenger car air suspension system will be …
Nov 21, 2022 · At the end of last year, Shijia Technology, an air suspension solution provider, announced that it had completed the Pre-A round of financing of tens of millions of yuan. The …

Chinese auto parts supplier Shanghai SDRIVE closes Pre-A
Sep 25, 2023 · Photo credit: SDRIVE Founded in September 2021, SDRIVE is headquartered in Jiading District, Shanghai, and has primarily focuses on the R&D, manufacturing, and sale of …

□□□□□□□□□□ - apsoto.com
The One Box air suspension controller brings users a comfortable driving experience like a gimbal: The air suspension eight-in-one integrated One Box, currently the world's only two, …

Shijia Technology completed tens of millions of Pre-A round of …
Shijia Technology is an air suspension solution provider, focusing on vehicle z-direction solutions, and is mainly committed to R&D, production and sales of air suspension system core …

Master the concept of exponential functions with our engaging practice problems. Enhance your skills and boost your confidence. Learn more today!

Back to Home