

Practice 8-7

Exponential Functions

Complete the table for each exercise.

1. Investment increases by 1.5 times every 5 yr.

Time	Value of Investment
Initial	\$800
5 yr	\$1200
10 yr	\$1800
15 yr	\$2700
20 yr	
25 yr	

2. The number of animals doubles every 3 mo.

Time	Number of Animals
Initial	18
3 mo	36
6 mo	72
9 mo	
12 mo	

3. The amount of matter halves every year.

Time	Amount of Matter
Initial	3200 g
1 yr	1600 g
2 yr	800 g
3 yr	

Evaluate each function for the domain $\{-2, 0, 1, 2, 4\}$.

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|--------------------------------------|---|---------------------------------|
| 4. $y = 2^x$ | 5. $y = 3.1^x$ | 6. $y = 0.8^x$ |
| 7. $y = 2 \cdot 4^x$ | 8. $y = 10 \cdot 3^x$ | 9. $y = 25 \cdot 5^x$ |
| 10. $y = \left(\frac{2}{3}\right)^x$ | 11. $y = 100 \cdot \left(\frac{1}{10}\right)^x$ | 12. $y = \frac{1}{4} \cdot 8^x$ |

Graph each function.

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|---------------------------------|---------------------------------|--|
| 13. $y = 3^x$ | 14. $y = 6^x$ | 15. $y = 1.5^x$ |
| 16. $y = 7^x$ | 17. $y = 10 \cdot 5^x$ | 18. $y = 16 \cdot 0.5^x$ |
| 19. $y = \frac{1}{8} \cdot 2^x$ | 20. $y = \frac{1}{2} \cdot 4^x$ | 21. $y = 8 \cdot \left(\frac{5}{2}\right)^x$ |

Evaluate each function rule for the given values.

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|---|---|
| 22. $y = 5.5^x$ for $x = 1, 3,$ and 4 | 23. $y = 4 \cdot 1.5^x$ for $x = 2, 4,$ and 5 |
| 24. $y = 3 \cdot 4^x$ for $x = 1, 3,$ and 5 | 25. $y = 6^x$ for $x = 2, 3,$ and 4 |
| 26. $y = 0.7^x$ for $x = 1, 3,$ and 4 | 27. $y = 3.1^x$ for $x = 1, 2,$ and 3 |
| 28. $y = 180 \cdot 0.5^x$ for $x = 0, -2,$ and $-\frac{1}{2}$ | 29. $y = 4.3^x$ for $x = -2, -1,$ and 0 |
| 30. $y = 100 \cdot 0.1^x$ for $x = -4, -1,$ and 2 | 31. $y = 5^x$ for $x = -2, -3,$ and 4 |

Solve each equation.

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|--------------------------|-----------------------------------|
| 32. $5^x = 625$ | 33. $2 \cdot 4^x = 128$ |
| 34. $4^x = \frac{1}{64}$ | 35. $4 \cdot 5^x = \frac{4}{125}$ |

Practice 8-8**Exponential Growth and Decay**

Write an exponential function to model each situation. Find each amount after the specified time.

- Suppose one of your ancestors invested \$500 in 1800 in an account paying 4% interest compounded annually. Find the account balance in each of the following years.
 - 1850
 - 1900
 - 2000
 - 2100
- Suppose you invest \$1500 in an account paying 4.75% annual interest. Find the account balance after 25 yr with the interest compounded the following ways.
 - annually
 - semiannually
 - quarterly
 - monthly
- The starting salary for a new employee is \$25,000. The salary for this employee increases by 8% per year. What is the salary after each of the following?
 - 1 yr
 - 3 yr
 - 5 yr
 - 15 yr
- Carbon-14 has a half-life of 5,700 years. Scientists use this fact to determine the age of things made of organic material. Suppose the average page of a book containing approximately 0.5 mg of carbon-14 is put into a time capsule. How much carbon-14 will each page contain after each of the following numbers of years?
 - 5700
 - 11,400
 - 22,800
 - 34,200
- The tax revenue that a small city receives increases by 3.5% per year. In 1990, the city received \$250,000 in tax revenue. Determine the tax revenue in each of the following years.
 - 1995
 - 1998
 - 2000
 - 2006
- Suppose the acreage of forest is decreasing by 2% per year because of development. If there are currently 4,500,000 acres of forest, determine the amount of forest land after each of the following.
 - 3 yr
 - 5 yr
 - 10 yr
 - 20 yr
- A \$10,500 investment has a 15% loss each year. Determine the value of the investment after each of the following.
 - 1 yr
 - 2 yr
 - 4 yr
 - 10 yr
- A city of 2,950,000 people has a 2.5% annual decrease in population. Determine the city's population after each of the following.
 - 1 yr
 - 5 yr
 - 15 yr
 - 25 yr
- A \$25,000 purchase decreases 12% in value per year. Determine the value of the purchase after each of the following.
 - 1 yr
 - 3 yr
 - 5 yr
 - 7 yr