

Exponential & Logarithmic Functions Quiz Review Guide**I. Simplify each exponential expression:**

- Remember the laws of exponents.

1. $(b^6)^{4x-2}$

2. $5^{x-3} \cdot 5^{2x+1}$

3. $9^{a+4b} \cdot 3^{2a+b}$

4. $(7b^{2x})^3$

5. $(4^2)^{3x-5} \cdot 4^{7x+8}$

6. $(m^{2x+5})^{3x}$

II. Solve each equation:

- Common bases needed to make exponents equal each other.
- Calculator Method: Y1 = Left Side and Y2 = Right Side → Find intersection

7. $7^{2x+3} = 7^{6x-1}$

8. $(2^3)^{7-2x} = 8^{2x-9}$

9. $(3^2)^{3x+1} = (3^3)^{x+4}$

10. $4^{2x+3} = 16^{x-1}$

11. $3^{5-x} = 27^{2x}$

12. $5^{3x+1} = 25^{x+4}$

III. Solve Exponential Word Problems: Set Up an Equation: $y = a(b)^x$

- 13. The price of a car that was bought for \$20,000 and has depreciated 15% yearly. Find the price of the car 6 years later.**

- 14. Find the value of a signed football that was bought for \$35 and its value has appreciated 8% each year after 20 years later.**

- 15. A town of 7800 grows at a rate of 35% every year. Find the size of the city in 10 years.**

- 16. A city of 200,000 is having pollution problems and is decreasing in size 3.5% annually (every year). Find the population of this city in 30 years.**

- 17. The depreciation of the value for a motorcycle is modeled by $y = 10,000(.85)^x$ for x years since 2000. In what year was the value of the car was \$6,141.25?**

- 18. A new automobile is purchased for \$20,000. If $V = 2,000(0.8)^x$, gives the car's value after x years, *about* how long will it take for the car to be worth \$820?**

- 19. A bacteria colony started with 2 bacteria. The colony is growing exponentially at 10% per hour. How long will it take to have 300 bacteria?**

IV. Convert to logarithmic form:

20. $5^{-3} = \frac{1}{125}$

22. $a^b = c$

21. $8 = 16^{\frac{3}{4}}$

23. $7^{2x+1} = 3$

V. Convert to exponential form:

24. $\log_6 36 = 2$

26. $\log_8 4 = \frac{2}{3}$

25. $\log_4 \frac{1}{64} = -3$

27. $\log_x y = z$

VI. Evaluate each expression:

28. $\log_3 27$

29. $\log_6 \frac{1}{36}$

30. $\log_{16} 4$

31. $\log_b b^5$

32. $\log_8 1$

33. $\log_7 7$