

Exponential Functions Pre-Assessment

For Problems 1-10, use properties of exponents to write each of the following expressions in a simpler equivalent form.

1. $(y^{10})(y^3)$ y^{13}

2. $(a^4)^3$ a^{12}

3. $(b^2)^0$ 1

4. c^8/c^2 c^6

5. $(3t)^{-2}$ $\frac{1}{9t^2}$

6. $(3x^2y^3)(4x^4y^7)$ $12x^6y^{10}$

7. $(2xy^5)^3$ $8x^3y^{15}$

8. $(-3a^5)^2(2ab^3)$ $18a^{11}b^3$

9. $18x^6/3x^3$ $6x^3$

10. $6xy^{-1}$ $\frac{6x}{y}$

Simplify the radical expressions.

11. $\sqrt{25}$ 5

12. $\sqrt{24}$ $2\sqrt{6}$

13. $\sqrt{81x^2}$ $9x$

14. $\sqrt{y^4}$ y^2

15. $\sqrt{48x^3y}$ $4x\sqrt{3xy}$

16. $\sqrt[3]{8}$ 2

17. $\sqrt[3]{24x^3}$ $2x\sqrt[3]{3}$

18. $\sqrt[3]{250y^4}$ $5y\sqrt[3]{2y}$

Rewrite the rational exponents as radical expressions.

19. $x^{1/2}$ \sqrt{x}

20. $2c^{3/4}$ $2\sqrt[4]{c^3}$

21. $(-3y)^{5/2}$ $\sqrt[2]{(-3y)^5}$

Rewrite the radical expression with rational exponents.

22. $\sqrt{5x}$ $(5x)^{1/2}$

23. $-2\sqrt[3]{y}$ $-2y^{1/3}$

24. $\sqrt[5]{-32d^{12}}$ $(-32d^{12})^{1/5}$

Solve each equation.

25. $3x^2 = 27$ $x = \pm 3$

29. $2^x = 4$ $x = 2$

26. $\sqrt[3]{x-2} = 5$ $x = 127$

30. $5^{x-2} = 25$ $x = 4$

27. $\sqrt{2x} = \sqrt{12-x}$ $x = 4$

31. $4^{2x-3} + 6 = 12$ $x = 2.15$

28. $x^{2/3} = 4$ $x = 8$

Tell the inverse operation that would be used to solve each of the following equations.

32. $x + 5 = 10$

subtract 5

33. $2x = 12$

divide by 2

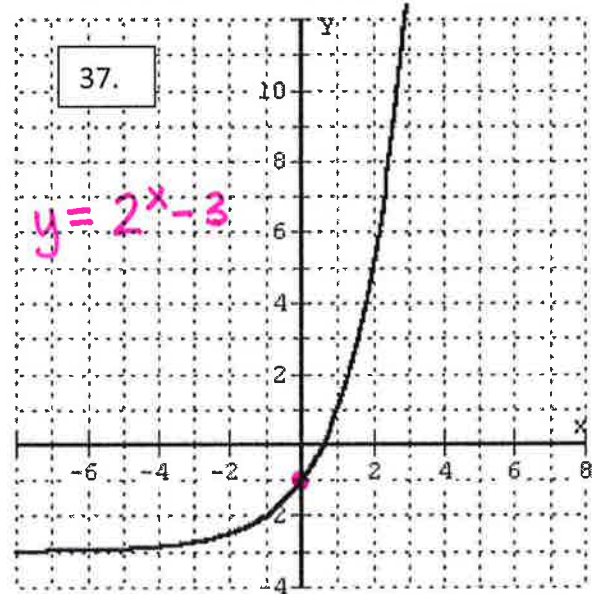
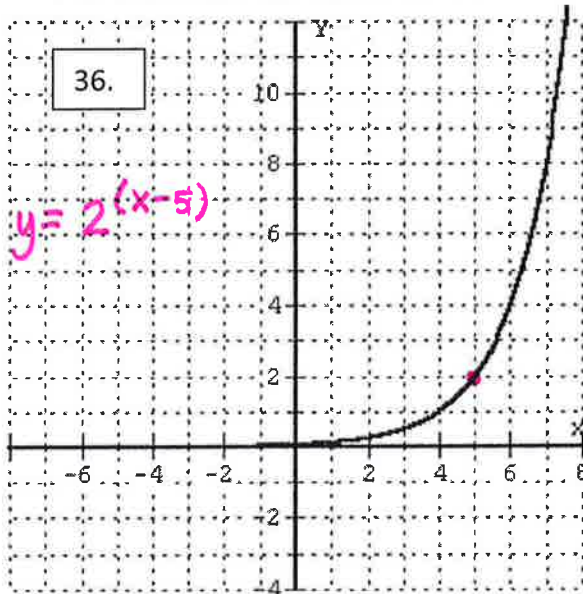
34. $x - 7 = 14$

add 7

35. $\frac{x}{3} = 5$

multiply by 3

Each of the equations below is a translation of the parent function $f(x) = 2^x$. Write an equation in the form $y = 2^{(x-h)} + k$. Where h is the horizontal translation and k is the vertical translation.



38. A population of 100 rabbits doubles every 5 years. How many rabbits will there be in 20 years?

$$y = 100 \cdot 2^4 = 1600 \text{ rabbits}$$

39. The value of a house increases by 2% every 10 years. If you buy a home for \$200,000 in 2020, how much will it be worth in 2025?

$$y = 200\,000 (1.02)^{\frac{5}{10}} = \$201\,990.10$$

40. A car's value depreciates by 6.25% each year. How much will a \$15,325 car be worth when you sell it in 8 years?

$$y = 15\,325 (1 - 0.0625)^8 = \$9\,144.73$$

41. In 2000, 50 grams of radium were stored. The half-life of radium is 1,620 years. How many grams of radium remain after 4860 years?

$$y = 50 (.5)^{\frac{4860}{1620}} = 6.25 \text{ grams of Radium}$$

42. You invest \$100 in an account that pays 2.5% interest annually. How long will it be before you have \$1000 in your account? Round your answers to the nearest hundredth.

$$1000 = 100 (1.025)^x \quad x = 10.32 \text{ years}$$

43. Suppose (0,2) and (2,18) are on the graph of an exponential function. What exponential function in the form $y = a \cdot b^x$ goes through those two points?

$$y = 2 \cdot 3^x$$