LESSON 169 Review: Exponential Equations and Functions

Try to complete as fast as you can. You may use a calculator unless otherwise specified.

1. $(2x^2)(5x^3)$

Simplify the expression above using only positive exponents.

2. $\dfrac{(9x^{-4})(2x^3)}{6x}$

Simplify the expression above using only positive exponents.

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

If the expression above is written in the form ax^k, what is the value of ak ?

4. $\left(\dfrac{x^3y^2}{x^2y^4}\right)^5$

If the expression above is written in the form $x^m y^n$, what is the value of $m - n$?

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

Simplify the expression above. Write your answer in the form ae^k.

6. $(6e^{-3x})^2$

If the expression above is written in the form ae^k, what is the value of a/k ?

7. $7^{5-2x} = 7^{-x}$

What value of x satisfies the equation above?

8. $2^{2x-5} = 8$

Given the equation above, what is the value of 2^x ?

9. $100^{2x-7} = \left(\dfrac{1}{1000}\right)^x$

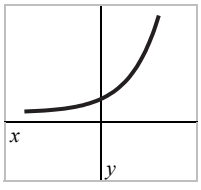
Given the equation above, what is the value of $2x$?

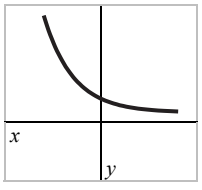
10. If $3^x \cdot 9^y = 27^z$, which equation is true?

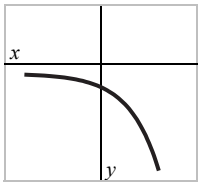
A) $xy = z$ B) $x \cdot 2y = 3z$

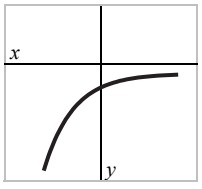
C) $x + y = z$ D) $x + 2y = 3z$

11. Which could be the graph of $f(x) = 2^x$?

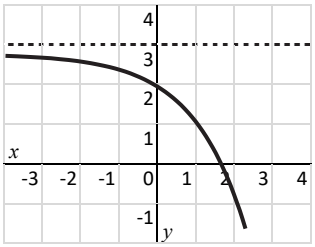
A) 

B) 

C) 

D) 

12. Which function is graphed below? The dotted line indicates the asymptote.



A) $f(x) = 2(2)^x$

B) $f(x) = 2^x + 3$

C) $f(x) = -2(2)^x$

D) $f(x) = -2^x + 3$

13. What is the range of $f(x) = 4^x + 1$? Write your answer in interval notation.

14. What is the equation of the asymptote of the graph of $f(x) = 3^{x-1} - 4$?

A) $y = 1$ B) $y = 1$

C) $y = 3$ D) $y = -4$

15. Write an exponential function in the form $f(x) = ab^x$ whose graph passes through $(0, 5)$ and $(1, 10)$.

16. Write an exponential function in the form $f(x) = ab^x$ whose graph passes through $(-1, 18)$ and $(1, 2)$.

17. The graph of $y = e^x$ is reflected over the x-axis, and shifted left 2 units and down 3 units to obtain the graph of $f(x)$. Write the equation of $f(x)$.

18. The function $y = 22000(0.8)^t$ models the resale value of a car t years after purchase. What is the purchase value of the car?

19. Amy put $\$4{,}000$ in an account that earns 4% interest compounded annually. Write an exponential function in the form $y = ab^x$ that models the balance of the account, y, after t years.

20. The population of a town is $80{,}000$ this year, and it is expected to decline at a rate of 5% per year. What will be the population after 10 years? Round your answer to the nearest thousand.

21. During a science experiment, Jessica found that bacteria double every two hours. There were 10 bacteria in the beginning. How many bacteria will be there after 8 hours?

22. (CHALLENGE) Express $25^x - 5^{x+2}$ in terms of y if $y = 5^x$.