

AP Statistic
Exp/Log Review

Name _____

Tell whether the function represents exponential growth or decay. Identify the percent increase or decrease.

1. $f(x) = \left(\frac{1}{3}\right)^x$
decay
 $(1 - .67)^x$
67% decrease

2. $f(x) = 5^x$
growth
 $(1 + .4)^x$
400% increase

3. $f(x) = \frac{1}{3}e^x$
growth
 $(1 + 1.7)^x$
170% increase

4. $f(x) = 3e^{-0.75x}$
decay
 $3(1 - .53)^x$
53% decrease

5. You deposit \$1500 in an account that pays 7% annual interest. Find the balance after 2 years when the interest is compounded daily.

$$A = 1500 \left(1 + \frac{.07}{360}\right)^{360(2)}$$

$$= \$1725.39$$

Simplify each expression.

6. $e^4 \cdot e^{11}$
 e^{15}

7. $\frac{20e^3}{10e^6} = \frac{2}{e^3}$

8. $(-3e^{-5x})^2 = \frac{9}{e^{10x}}$

Find the inverse of the following

9. $f(x) = 8^x$
 $f^{-1}(x) = \log_8 x$

10. $f(x) = \log_3 x$
 $f^{-1}(x) = 3^x$

11. $y = \ln(x - 4)$
 $y = e^x + 4$

Find the value of x.

12. $2^x = 8$
 $x = 3$

13. $\log_x 36 = 2$
 $x^2 = 36$
 $x = 6$

14. $\log_5 x = -3$
 $5^{-3} = x$
 $\frac{1}{125} = x$

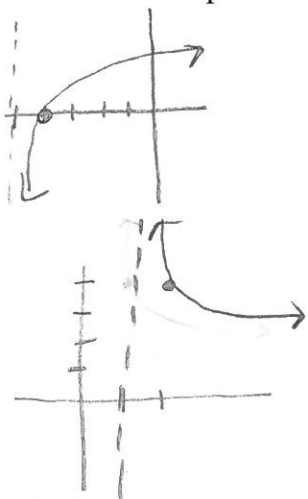
15. $\ln e^4 = x$
 $e^x = e^4$
 $x = 4$

16. $\log_9 x = \frac{3}{2}$
 $9^{\frac{3}{2}} = x$
 $27 = x$

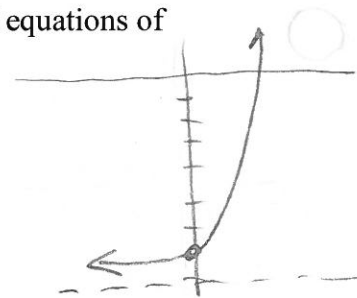
17. $\log 1 = x$
 $10^x = 1$
 $x = 0$

Sketch. Describe the transformations from the parent function, domain, range and equations of asymptotes.

18. $g(x) = \frac{1}{2} \log_4(x+5)$
 left 5, less steep
 $x = -5$
 $D: x > -5$
 $R: \mathbb{R}$

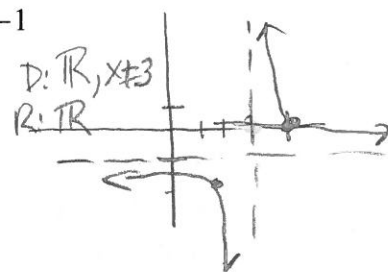


19. $f(x) = e^x - 8$
 down 8
 $y = -8$
 $D: \mathbb{R}$
 $R: y > -8$



20. $f(x) = -\log_2(x-1) + 4$
 reflect
 right 1
 up 4
 $x = 1$
 $D: x > 1$
 $R: \mathbb{R}$

21. $f(x) = \frac{1}{x-3} - 1$
 right 3
 down 1
 $x = 3$
 $y = -1$



Solve the following equations. Check for extraneous solutions.

22. $5^x = 8$
 $x \approx 1.29$

23. $\log_3(2x-5) = 2$
 $3^2 = 2x-5$
 $x = 7$

24. $\ln(x^2 + 2x) = 3$
 $e^3 = x^2 + 2x$
 $0 = x^2 + 2x - 20$
 $\frac{-2 \pm \sqrt{4 - 4(1)(-20)}}{2}$
 $3.6 \text{ or } -5.6$

25. $\frac{18-6x}{x^2-3x} = \frac{5}{x}$
 $x(18-6x) = 5(x^2-3x)$
 $18x - 6x^2 = 5x^2 - 15x$ (no sol.)
 $11x^2 - 33x = 0$
 $11x(x-3) = 0$
 $x = 0$
 $x = 3$

26. $\frac{-2}{x-1} = \frac{x-8}{x+1}$
 $-2(x+1) = (x-1)(x-8)$
 $-2x-2 = x^2-9x+8$
 $0 = x^2-7x+10$
 $0 = (x-5)(x-2)$
 $x = 5, x = 2$

27. $16^{3x-2} = \left(\frac{1}{4}\right)^{5-x}$
 $(4^2)^{3x-2} = (4^{-1})^{5-x}$
 $6x-4 = -5+x$
 $5x = -1$
 $x = -\frac{1}{5}$

28. $\log(4x+1) = \log 25$
 $4x+1 = 25$
 $4x = 24$
 $x = 6$

29. $2e^{3x} + 6 = 10$
 $e^{3x} = 2$
 $3x \ln e = \ln 2$
 $3x = \ln 2$
 $x = \frac{\ln 2}{3} \approx .231$

30. The length, L (in centimeters) of a scalloped hammerhead shark can be modeled by the function $L = 266 - 219e^{-0.05t}$, where t is the age (in years) of the shark.

- a. How old is the shark that is 200 centimeters long?
- b. How long is a shark that is twice as old as the shark in part (a)?

$200 = 266 - 219e^{-0.05t}$
 $t \approx 24$

$L = 266 - 219e^{-0.05(48)}$
 $L \approx 246.13 \text{ cm}$