

Algebra 2 ACC
Unit 4 SpringBoard Review

Name key
 Date _____ Per _____

Change to logarithmic form:

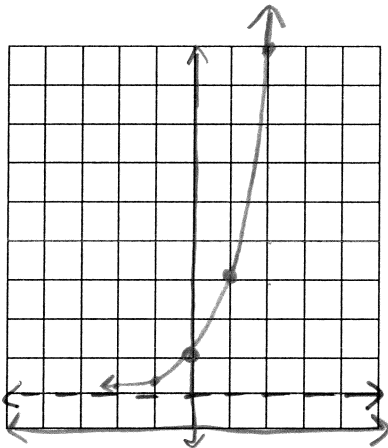
1. $3^4 = 81$ $\log_3 81 = 4$ 2. $\left(\frac{1}{4}\right)^{-1} = 4$ $\log_{(1/4)} 4 = -1$
 3. $11^{-2} = \frac{1}{121}$ $\log_{11} \left(\frac{1}{121}\right) = -2$ 4. $15^1 = 15$ $\log_{15} 15 = 1$

Change to exponential form:

5. $\log_6 216 = 3$ $6^3 = 216$ 6. $\log_{1/4} 16 = -2$ $\left(\frac{1}{4}\right)^{-2} = 16$
 7. $\log_{16} \frac{1}{4} = -\frac{1}{2}$ $16^{-1/2} = \frac{1}{4}$ 8. $\log 1 = 0$ $10^0 = 1$

Sketch the graphs and answer the following questions.

9. $f(x) = 3^x + 1$



Domain \mathbb{R}

Range $y > 1$

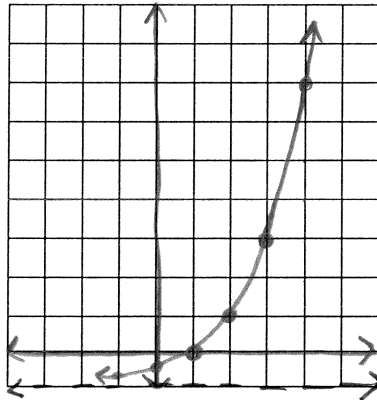
Asymptote? $y = 1$

End Behavior? $\text{As } x \rightarrow \infty, y \rightarrow \infty.$

$\text{As } x \rightarrow -\infty, y \rightarrow 1.$

Parent Function? $y = 3^x$

10. $f(x) = 2^{x-1} - 1$



Domain \mathbb{R}

Range $y > -1$

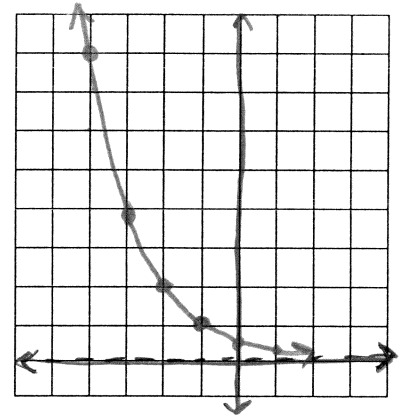
Asymptote? $y = -1$

End Behavior? $\text{As } x \rightarrow \infty, y \rightarrow \infty.$

$\text{As } x \rightarrow -\infty, y \rightarrow -1.$

Parent Function? $y = 2^x$

11. $f(x) = \left(\frac{1}{2}\right)^{x+1}$



Domain \mathbb{R}

Range $y > 0$

Asymptote? $y = 0$

End Behavior? $\text{As } x \rightarrow \infty, y \rightarrow 0.$

$\text{As } x \rightarrow -\infty, y \rightarrow \infty.$

Parent Function? $y = \left(\frac{1}{2}\right)^x$

12. Find the 15th term of the sequence: 10, 2, -6, -14, Then find the sum of the first 15 terms.

$a_{15} = 10 + (14)(-8)$

$a_{15} = -102$

$S_{15} = 15 \left(\frac{10 - 102}{2} \right)$

$= -690$

13. Find S_9 for $-8 + 1.6 - 3.2 + .064 - \dots$

$S_9 = -8 \left(\frac{1 + .2^9}{1 + .2} \right) = -6.67$

14. Evaluate.

$$\sum_{k=1}^{30} 12k + 2 = 30 \left(\frac{14 + 362}{2} \right) = \boxed{5640}$$

15. Find the infinite sum, if possible: $24 + 6 + 1.5 + .375 + \dots$

$$r = \frac{1}{4} \text{ converges since } \left| \frac{1}{4} \right| < 1$$

$$S = \frac{24}{1 - .25} = \boxed{32}$$

16. Consider the function $h(x) = 4\log_6(x - 5)$

A. Identify the parent function. $f(x) = \log_6 x$

B. Describe the transformations of $h(x)$ from the parent function identified above.
Vertical stretch by 4 and translated 5 right

C. State the domain, range, and any asymptotes for $h(x)$.

$$D: x > 5 \quad R: \mathbb{R} \quad \text{Asymptotes } x = 5$$

17. A new car is purchased for \$28,000. Sadly, it depreciates by 13% annually. When will the car be worth a quarter of its original value?

$$7000 = 28000 (.87)^t \quad \frac{1}{4} = .87^t$$

$$t \approx 10 \text{ years}$$

Solve for x :

18. $\log_{1/2} 8 = x \quad x = -3$

19. $\log_x 32 = -5 \quad x = \frac{1}{2}$

20. $8^x = \frac{1}{64} \quad x = -2$

21. $3^x = 81 \quad x = 4$

22. $2^x = 8^{x+1} \quad x = -3/2$

23. $9^{x-1} = 27^{3-x} \quad x = \frac{11}{5}$

24. $\log_8(x^2 - 2x) = \log_8 3$

$$x = 3, -1$$

25. $\ln\left(\frac{x}{2}\right) = \ln\left(\frac{3}{x+1}\right)$

$$x = 2$$

Simplify:

26. $\ln e = 1$

27. $\log 1 = 0$

28. $6\log_5 125 = 18$

29. $\log_7 7^{-3x} = -3x$

30. Daniel invests \$1500 in a bank with an interest rate of 7.2% that is compounded continuously. How much money will be in the bank after 13 years?

$$A = 1500 e^{(.072 \cdot 13)} = \boxed{\$3824.64}$$