

Advanced Algebra – Test Review #1
Exponential and Logarithmic Functions

Name _____ hr _____

Write an equation that meets the specified conditions.

_____ 1. An exponential function that shifts 3 units to the right of the parent function $y = 4^x$.

_____ 2. An exponential model representing an initial price of \$5000 which increases 4% yearly.

Write in logarithmic form.

3. $2^6 = 64$

4. $3^{-1} = \frac{1}{3}$

Write in exponential form.

5. $\log 1000 = 3$

6. $\log_5 \frac{1}{25} = -2$

Solve.

7. $3^{x+1} = 9^{x-2}$

8. $4^{5x} = \left(\frac{1}{2}\right)^{x-2}$

9. $100^x = 0.1$

10. $\log_6 216 = x$

11. $\log_x 4 = \frac{1}{4}$

12. $\log_2 9 = x$

13. $5^{3x} = 37$

14. $3^{x-1} = 28$

15. $30 = 5(2)^x$

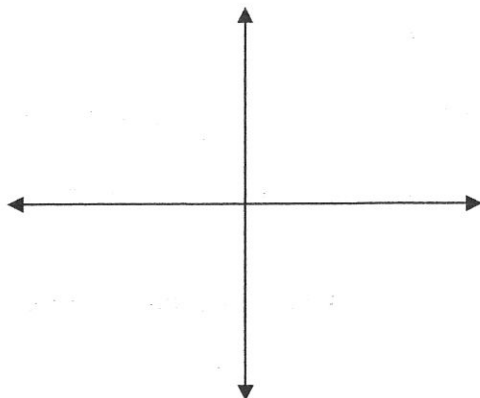
16. $\log (x - 3) = 2$

17. $\log x - 3 = 2$

18. $\log x = -2$

Make a t-chart and graph the functions below. Identify the desired characteristics of the graph.

19. $y = 2^x - 3$



Growth or Decay (circle one)

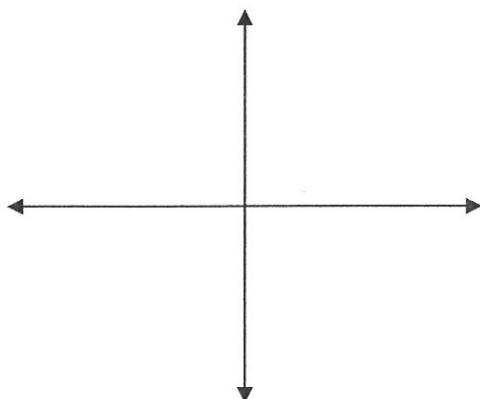
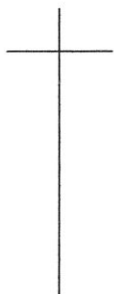
Domain: _____

Range: _____

y-intercept: _____

equation for asymptote: _____

20. $y = \log_4 x$



Domain: _____

Range: _____

y-intercept: _____

equation for asymptote: _____

Solve.

21. Write an exponential function whose graph passes through (1, 12) and (6, 2916).

22. As technology advances, the price of many technological devices goes down. One brand of a graphing calculator currently sells for \$89. If the price decreases by 6% per year, how much will it cost after 5 years?

23. If \$5,000 is invested in a CD that earns 4% interest and is compounded quarterly, find the amount the CD is worth after 18 months.

$$A = P \left(1 + \frac{r}{n} \right)^n$$

Advanced Algebra – Test Review #1
Exponential and Logarithmic Functions

Name Kay hr

Write an equation that meets the specified conditions.

$y = 4^{x-3}$ 1. An exponential function that shifts 3 units to the right of the parent function $y = 4^x$.

$y = 5000(1.04)^x$ 2. An exponential model representing an initial price of \$5000 which increases 4% yearly.

Write in logarithmic form.

3. $2^6 = 64$

$\log_2 64 = 6$

4. $3^{-1} = \frac{1}{3}$

$\log_3 \frac{1}{3} = -1$

Write in exponential form.

5. $\log_{10} 1000 = 3$

$10^3 = 1000$

6. $\log_5 \frac{1}{25} = -2$

$5^{-2} = \frac{1}{25}$

Solve.

7. $3^{x+1} = 9^{x-2}$

$3^{x+1} = (3^2)^{x-2}$

$x+1 = 2x-4$

$1 = x-4$

$\boxed{x = 5}$

8. $4^{5x} = \left(\frac{1}{2}\right)^{x-2}$

$(2^2)^{5x} = (2^{-1})^{x-2}$

$10x = -x + 2$

$11x = 2$

$\boxed{x = \frac{2}{11}}$

9. $100^x = 0.1 = \frac{1}{10}$

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

$2x = -1$

$\boxed{x = -\frac{1}{2}}$

10. $\log_6 216 = x$

$6^x = 216 \rightarrow 6^x = 6^3$

$x \cdot \log 6 = \log 216$

$x = \frac{\log 216}{\log 6}$

$\boxed{x = 3}$

11. $\log_x 4 = \frac{1}{4}$

$x^{1/4} = 4$

$x^{1/4} = 4$

$(x^{1/4})^4 = 4^4$ or $\sqrt[4]{x} = 4$

$\boxed{x = 256}$

$\sqrt[4]{x} = 4$

$\boxed{x = 256}$

12. $\log_2 9 = x$

$2^x = 9$

$x \cdot \log 2 = \log 9$

$x = \frac{\log 9}{\log 2}$

$\boxed{x = 3.1699}$

13. $5^{3x} = 37$

$3x \cdot \log 5 = \log 37$

$3x = \frac{\log 37}{\log 5}$

$3x = 2.2436$

$\boxed{x = 0.7479}$

14. $3^{x-1} = 28$

$(x-1) \cdot \log 3 = \log 28$

$x-1 = \frac{\log 28}{\log 3}$

$x-1 = 3.0331$

$\boxed{x = 4.0331}$

15. $\frac{30}{5} = \frac{5(2)^x}{5}$

$6 = 2^x$

$\log 6 = x \cdot \log 2$

$\frac{\log 6}{\log 2} = x$

$\boxed{x = 2.5850}$

16. $\log_{10} (x-3) = 2$

$10^2 = x-3$

$100 = x-3$

$\boxed{103 = x}$

17. $\log_{10} x - 3 = 2$

$\log_{10} x = 5$

$10^5 = x$

$\boxed{100,000 = x}$

18. $\log_{10} x = -2$

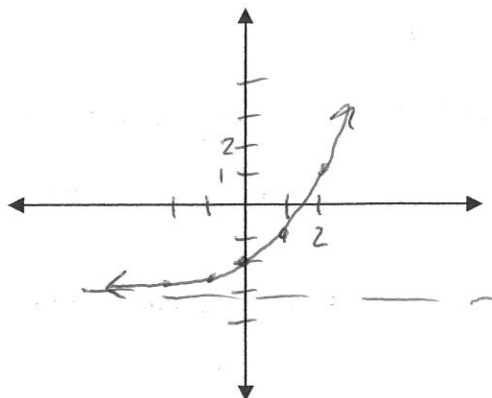
$10^{-2} = x$

$\boxed{\frac{1}{100} = x}$

Make a t-chart and graph the functions below. Identify the desired characteristics of the graph.

19. $y = 2^x - 3$

x	y
-2	-2.75
-1	-2.5
0	-2
1	-1
2	1



Growth or Decay (circle one)

Domain: \mathbb{R}

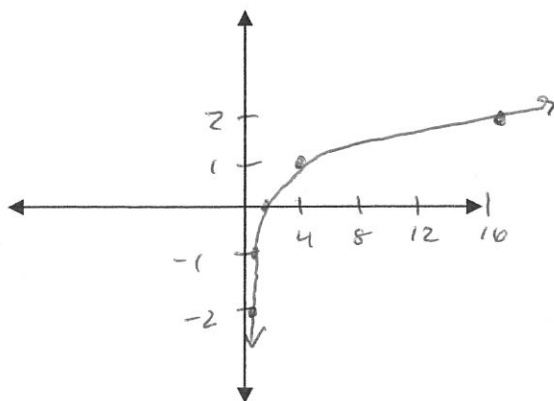
Range: $y > -3$

y-intercept: $(0, -2)$

equation for asymptote: $y = -3$

20. $y = \log_4 x$

x	y
$1/16$	-2
$1/4$	-1
1	0
4	1
16	2



Domain: $x > 0$

Range: \mathbb{R}

y-intercept: None

equation for asymptote: $x = 0$

x-int $(1, 0)$

Solve.

21. Write an exponential function whose graph passes through $(1, 12)$ and $(6, 2916)$.

$$\begin{aligned} 2916 &= a \cdot b^6 \\ 12 &= a \cdot b^1 \\ \hline 243 &= b^5 \\ \sqrt[5]{243} &= b^5 \\ 3 &= b \end{aligned}$$

$$\begin{aligned} 2916 &= a \cdot 3^6 \\ 2916 &= a \cdot 729 \\ 4 &= a \end{aligned}$$

$$y = 4(3)^x$$

22. As technology advances, the price of many technological devices goes down. One brand of a graphing calculator currently sells for \$89. If the price decreases by 6% per year, how much will it cost after 5 years?

$$\begin{aligned} b &= 1 + r \\ b &= 1 - .06 \\ b &= 0.94 \end{aligned}$$

$$\begin{aligned} y &= 89(0.94)^x \\ y &= 89(0.94)^5 \\ y &= \$65.32 \end{aligned}$$

23. If \$5,000 is invested in a CD that earns 4% interest and is compounded quarterly, find the amount the CD is worth after 18 months.

$$t = 18 \text{ mo} = 1.5 \text{ yrs}$$

$$A = P \left(1 + \frac{r}{n} \right)^n$$

$$A = 5000 \left(1 + \frac{.04}{4} \right)^{4 \cdot 1.5}$$

$$A = \$5307.60$$

Advanced Algebra – Review #2
Ch. 8 Exponential Functions and Logarithms

Name _____ hr _____

Write an equation that meets the specified conditions.

- _____ 1. An exponential function that represents an initial population of 5614 which increases at 5.2% per year.
- _____ 2. An exponential function that reflects over the x-axis, translates 5 units to the right and 2 units up of the parent function $y = 2(5)^x$
- _____ 3. An exponential function, $y = a \cdot b^x$, that contains the points (-4, 81) and (-1, 24).

Write in logarithmic form.

Write in exponential form.

4. $3^5 = 243$ 5. $2^0 = 1$ 6. $\log_6 216 = 3$ 7. $\log 0.1 = -1$

Evaluate each logarithm. Round to the nearest ten-thousandth if needed.

Answer the question.

8. $\log_7 31$ 9. $\log_{1/6} 42$ 10. State how you would read: $\log_8 \frac{1}{64} = -2$.

Solve each equation. Round solutions to the nearest ten-thousandth if needed.

11. $5^x = 25$ 12. $2^{3x+1} = 4^x$ 13. $4^{3x-1} = 8^{x+2}$ 14. $3^{2x-5} = \frac{1}{27}$

Solve each equation. Round solutions to the nearest ten-thousandth if needed.

15. $4^x = 26$

16. $6^{2x} = 27$

17. $7^{x-9} = 16$

18. $-12 + 2^x = 3$

19. $\log_{1000} 100 = x$

20. $\log_x 32 = 5$

21. $\log(x-5) = 2$

22. $\log_{125} x = \frac{2}{3}$

Solve each question below.

23. \$10,000 is deposited into an account that pays 4.75% interest compounded monthly. What is the balance on the account after 3 years?

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

24. A car that sells for \$32,000 depreciates 10% each year? A) Write a function that models the value of the car. B) Find the value of the car after 4 years.

a) _____

b) _____

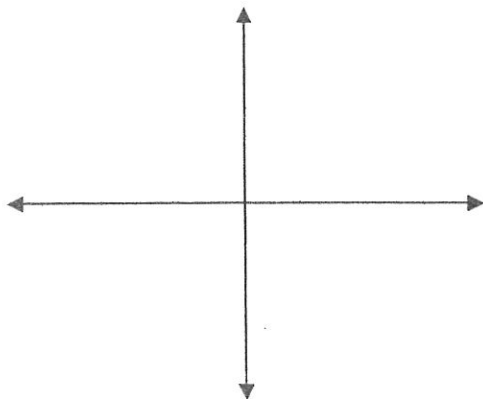
25. A parent raises a child's allowance by 20% each year. If the allowance is \$8 now, when will it reach \$20?
Round to the nearest hundredth.

Make a t-chart and graph the functions below. Identify the desired characteristics of the graph.

Label axis intervals.

26. $y = 3^x - 4$

x	y



Growth or Decay (circle one)

Domain: _____

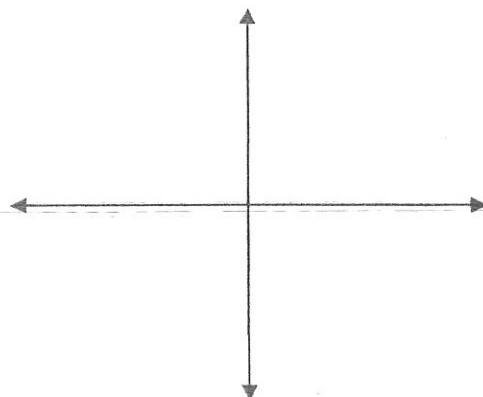
Range: _____

y-intercept: _____

equation for asymptote: _____

27. $y = \log_{1/5} x$

x	y



Domain: _____

Range: _____

y-intercept: _____

equation for asymptote: _____

Advanced Algebra – Review #2
Ch. 8 Exponential Functions and Logarithms

Name Key hr

Write an equation that meets the specified conditions.

$y = 5614(1.052)^x$ 1. An exponential function that represents an initial population of 5614 which increases at 5.2% per year.

$y = -2(5)^{x-5} + 2$ 2. An exponential function that reflects over the x-axis, translates 5 units to the right and 2 units up of the parent function $y = 2(5)^x$

$y = 16\left(\frac{2}{3}\right)^x$ 3. An exponential function, $y = a \cdot b^x$, that contains the points (-4, 81) and (-1, 24).

$$\begin{aligned} 24 &= a \cdot b^{-1} \\ 81 &= a \cdot b^{-4} \\ \frac{24}{81} &= \frac{a \cdot b^{-1}}{a \cdot b^{-4}} \\ \frac{8}{27} &= b^3 \\ \frac{2}{3} &= b \end{aligned}$$

$$\begin{aligned} 24 &= a \left(\frac{2}{3}\right)^{-1} \\ 24 &= a \left(\frac{3}{2}\right) \\ a &= 16 \end{aligned}$$

Write in logarithmic form.

Write in exponential form.

4. $3^5 = 243$

5. $2^0 = 1$

6. $\log_6 216 = 3$

7. $\log 0.1 = -1$

$$\log_3 243 = 5$$

$$\log_2 1 = 0$$

$$6^3 = 216$$

$$10^{-1} = 0.1$$

Evaluate each logarithm. Round to the nearest ten-thousandth if needed.

Answer the question.

8. $\log_7 31 = x$

9. $\log_{1/6} 42 = x$

10. State how you would read: $\log_8 \frac{1}{64} = -2$.

$$\begin{aligned} 7^x &= 31 \\ x \cdot \log 7 &= \log 31 \\ x &= \frac{\log 31}{\log 7} \end{aligned}$$

$$\begin{aligned} \left(\frac{1}{6}\right)^x &= 42 \\ x \cdot \log \frac{1}{6} &= \log 42 \\ x &= \frac{\log 42}{\log 1/6} \end{aligned}$$

log base eight of one-sixth fourth equals negative two

$$x = 1.7647$$

$$x = -2.0860$$

Solve each equation. Round solutions to the nearest ten-thousandth if needed.

11. $5^x = 25$

12. $2^{3x+1} = 4^x$

13. $4^{3x-1} = 8^{x+2}$

14. $3^{2x-5} = \frac{1}{27}$

$$5^x = 5^2$$

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

$$(2^2)^{3x-1} = (2^3)^{x+2}$$

$$3^{2x-5} = 3^{-3}$$

$$x = 2$$

$$3x+1 = 2x$$

$$6x-2 = 3x+6$$

$$2x-5 = -3$$

$$1 = -x$$

$$3x = 8$$

$$2x = 2$$

$$-1 = x$$

$$x = 8/3$$

$$x = 1$$

Solve each equation. Round solutions to the nearest ten-thousandth if needed.

15. $\log 4^x = 26$

$$x \cdot \log 4 = \log 26$$

$$x = \frac{\log 26}{\log 4}$$

$$\boxed{x = 2.3502}$$

16. $\log_6 27 = 2x$

$$2x \cdot \frac{\log 6}{\log 6} = \frac{\log 27}{\log 6}$$

$$2x = 1.8394$$

$$\boxed{x = 0.9197}$$

17. $\log_7 x - 9 = 16$

$$(x-9) \cdot \frac{\log 7}{\log 7} = \frac{\log 16}{\log 7}$$

$$x-9 = 1.4248$$

$$\boxed{x = 10.4248}$$

18. $-12 + 2^x = 3$

$$\log 2^x = \frac{\log 15}{\log 2}$$

$$x \cdot \frac{\log 2}{\log 2} = \frac{\log 15}{\log 2}$$

$$\boxed{x = 3.9069}$$

19. $\log_{1000} 100 = x$

$$\log 1000^x = \log 100$$

$$x \cdot \log 1000 = \log 100$$

$$x = \frac{\log 100}{\log 1000}$$

$$\boxed{x = 2/3}$$

or $1000^x = 100$
 $10^{3x} = 10^2$
 $3x = 2$

20. $\log_x 32 = 5$

$$x^5 = 32$$

$$\sqrt[5]{x^5} = \sqrt[5]{32}$$

$$\boxed{x = 2}$$

21. $\log(x-5) = 2$

$$10^2 = x-5$$

$$100 = x-5$$

$$\boxed{105 = x}$$

22. $\log_{125} x = \frac{2}{3}$

$$125^{2/3} = x$$

$$\boxed{25 = x}$$

Solve each question below.

23. \$10,000 is deposited into an account that pays 4.75% interest compounded monthly. What is the balance on the account after 3 years?

$$A = P(1 + \frac{r}{n})^{nt}$$

$$A = 10000(1 + \frac{0.0475}{12})^{12 \cdot 3}$$

$$\boxed{A = \$11,528.29}$$

24. A car that sells for \$32,000 depreciates 10% each year? A) Write a function that models the value of the car. B) Find the value of the car after 4 years.

$$b = 1+r$$

$$b = 1-.1$$

$$b = .9$$

$$y = a \cdot b^x$$

$$y = 32000(.9)^4$$

a) $y = 32000(0.9)^x$

b) $\$20,995.20$

25. A parent raises a child's allowance by 20% each year. If the allowance is \$8 now, when will it reach \$20? Round to the nearest hundredth.

$$b = 1+r$$

$$b = 1+.2$$

$$b = 1.2$$

$$y = a \cdot b^x$$

$$\frac{20}{8} = \frac{8(1.2)^x}{8}$$

$$\log 2.5 = \log 1.2^x$$

$$\log 2.5 = x \cdot \log 1.2$$

$$\frac{\log 2.5}{\log 1.2} = x$$

$$5.0257 = x$$

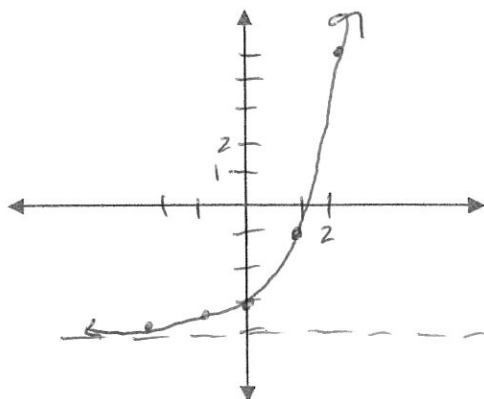
$$\boxed{x \approx 5.0257 \text{ yrs}}$$

Make a t-chart and graph the functions below. Identify the desired characteristics of the graph.

Label axis intervals.

26. $y = 3^x - 4$

x	y
-2	$-3^{8/9}$
-1	$-3^{2/3}$
0	-3
1	-1
2	5



Growth or Decay (circle one)

Domain: \mathbb{R}

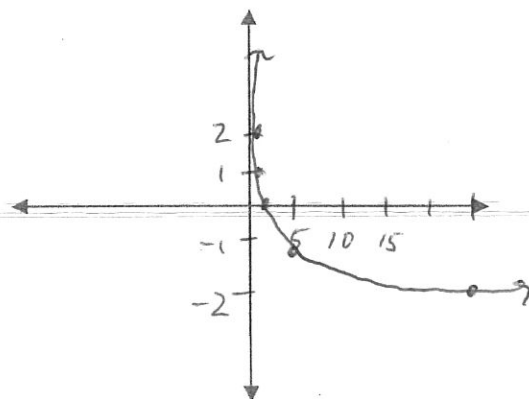
Range: $y > -4$

y-intercept: $(0, -3)$

equation for asymptote: $y = -4$

27. $y = \log_{1/5} x$

x	y
25	-2
5	-1
1	0
$1/5$	1
$1/25$	2



Domain: $x > 0$

Range: \mathbb{R}

y-intercept: None

equation for asymptote: $x = 0$

x-int: $(1, 0)$