

Determine whether each situation represents a linear, quadratic, or exponential relationship between x and y . Circle your choice. (1 point each)

- | | | | | |
|----|----------------------|-----------|-----------|-------------|
| 1. | $f(x) = 2x^2 + 5$ | 1. LINEAR | QUADRATIC | EXPONENTIAL |
| 2. | $f(x) = 4x - 8$ | 2. LINEAR | QUADRATIC | EXPONENTIAL |
| 3. | $f(x) = 2^{x-1} - 4$ | 3. LINEAR | QUADRATIC | EXPONENTIAL |

Determine whether each situation represents exponential growth or decay. Circle your choice. Then determine the growth/decay rate. Determine the y intercept. 3 points each

- | | | | | |
|----|--------------------|---------------------------|--------|-------------|
| 4. | $g(x) = (.60)^x$ | 4. <u>GROWTH OR DECAY</u> | _____ | _____ |
| | | | RATE % | Y INTERCEPT |
| 5. | $h(x) = 5(1.20)^x$ | 5. <u>GROWTH OR DECAY</u> | _____ | _____ |
| | | | RATE % | Y INTERCEPT |

5. The initial population of bacteria in a lab is 300. The number of bacteria triples every 4 hours. Predict the bacteria population at the end of 16 hours. SHOW WORK

5. _____

6. The population of Macomb was 74,300 in 2000. The population was projected to grow at a rate of about 3.5% per decade. A decade is every 10 years. Predict the population of the city, to the nearest thousand, in the year 2050. SHOW WORK

6. _____

7. Kellie bought a car for \$24,500. The salesperson projected that the value of the car would decline by 7% per year for the next 5 years. What would be the value, to the nearest hundred dollars, of Kellie's car after 5 years? SHOW WORK

7. _____

8. Find the final amount of the investment if \$9500 is invested at 5% interest compounded quarterly for 12 years. SHOW WORK

8. _____

9. You deposit \$7200 in an account at 4.5% compounded continuously. How much do you have in the account after 10 years?

9. _____

10. $f(x) = -4(2^{x+3}) + 7$

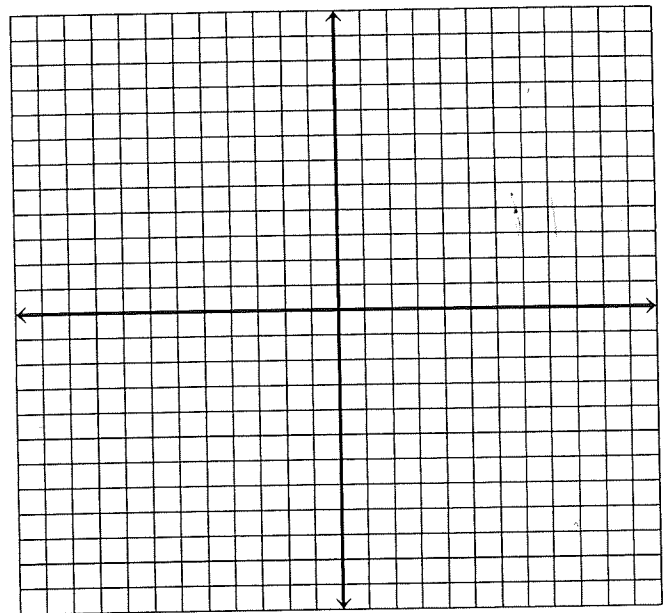
Draw in the asymptote with a dashed line. (3 points)

<i>Parent</i>	
<i>x</i>	<i>y</i>
-2	1/4
-1	1/2
0	1
1	2
2	4
3	8

<i>x</i>	<i>y</i>

<i>x</i>	<i>y</i>

<i>x</i>	<i>y</i>



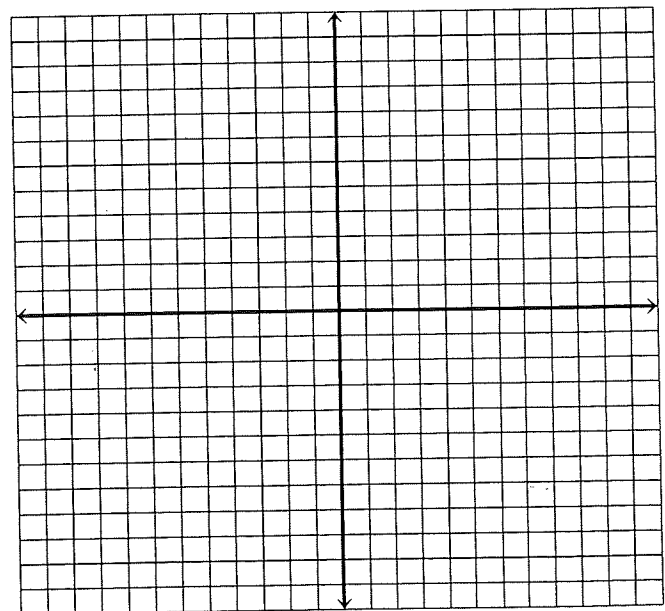
11. $f(x) = 2(2^{x-6}) - 5$

<i>Parent</i>	
<i>x</i>	<i>y</i>
-2	1/4
-1	1/2
0	1
1	2
2	4
3	8

<i>x</i>	<i>y</i>

<i>x</i>	<i>y</i>

<i>x</i>	<i>y</i>



12. What is the y-intercept of $f(x) = (1.75)^x$?

12. _____

13. Write the equation in logarithmic form.

a. $5^{-4} = \frac{1}{625}$

13. _____

14. Write the equation in exponential form.

a. $\log_7 2401 = 4$

14. _____

Solve for v . **SHOW WORK**

15. $\log_8 v = 3$

16. $\log_6 v = -1$

15. _____

16. _____

17. $\log_2 64 = v$

18. $\log_v 256 = 4$

17. _____

18. _____

Evaluate the logarithmic expression. Round your answer to the nearest hundredth. **SHOW WORK**

19. $\log_4 12 + 4$

19. _____

Evaluate the logarithmic expression. Round your answer to the nearest hundredth. **SHOW WORK**

20. $\log_3 15$

20. _____

Expand the log expression. Simplify if possible.

21. $\log_6 \frac{36}{a^2}$

21. _____

Expand the log expression. Simplify if possible.

22. $\log_7 49d^4$

22. _____

Expand the log expression. Simplify if possible.

23. $\log_2 \frac{a^3 b^4}{c^5}$

23. _____

Rewrite as a single log. Simplify if possible.

24. $2\log_4 3 - 2\log_4 x$

24. _____

Rewrite as a single log. Simplify if possible.

25. $2\log a + 3\log b - 2\log c$

25. _____

Determine whether each situation represents a linear, quadratic, or exponential relationship between x and y. Circle your choice. (1 point each)

1. $f(x) = 2x^2 + 5$

1. LINEAR QUADRATIC EXPONENTIAL

2. $f(x) = 4x - 8$

2. LINEAR QUADRATIC EXPONENTIAL

3. $f(x) = 2^{x-1} - 4$

3. LINEAR QUADRATIC EXPONENTIAL

Determine whether each situation represents exponential growth or decay. Circle your choice. Then determine the growth/decay rate. Determine the y intercept. 3 points each

4. $g(x) = (.60)^x$

4. GROWTH OR DECAY 40% 1 / (0, 1)
RATE % Y INTERCEPT

5. $h(x) = 5(1.20)^x$

5. GROWTH OR DECAY 20% 5 / (0, 5)
RATE % Y INTERCEPT

5. The initial population of bacteria in a lab is 300. The number of bacteria triples every 4 hours. Predict the bacteria population at the end of 16 hours. SHOW WORK

$300(3)^x$
 $300(3)^4$

5. 24300 bacteria

6. The population of Macomb was 74,300 in 2000. The population was projected to grow at a rate of about 3.5% per decade. A decade is every 10 years. Predict the population of the city, to the nearest thousand, in the year 2050. SHOW WORK

$74300(1 + .035)^x$
 $74300(1.035)^5$
88245.1

2000
2010
2020
2030
2040
2050

6. 88000 people

7. Kellie bought a car for \$24,500. The salesperson projected that the value of the car would decline by 7% per year for the next 5 years. What would be the value, to the nearest hundred dollars, of Kellie's car after 5 years? SHOW WORK

$24500(1 - .07)^x$
 $24500(.93)^5$
17044.4

7. \$17000.00

8. Find the final amount of the investment if \$9500 is invested at 5% interest compounded quarterly for 12 years. SHOW WORK $n=4$ $t=12$

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

$$= 9500\left(1 + \frac{0.05}{4}\right)^{4 \cdot 12}$$

$$= 17245.9$$

8. \$17,245.90 ¹²

9. You deposit \$7200 in an account at 4.5% compounded continuously. How much do you have in the account after 10 years?

$$A = Pe^{rt}$$

$$= 7200e^{0.045 \cdot 10}$$

$$= 7200e^{0.45} = 11291.8$$

9. \$11,291.80 ¹²

10. $f(x) = -4(2^{x+3}) + 7$

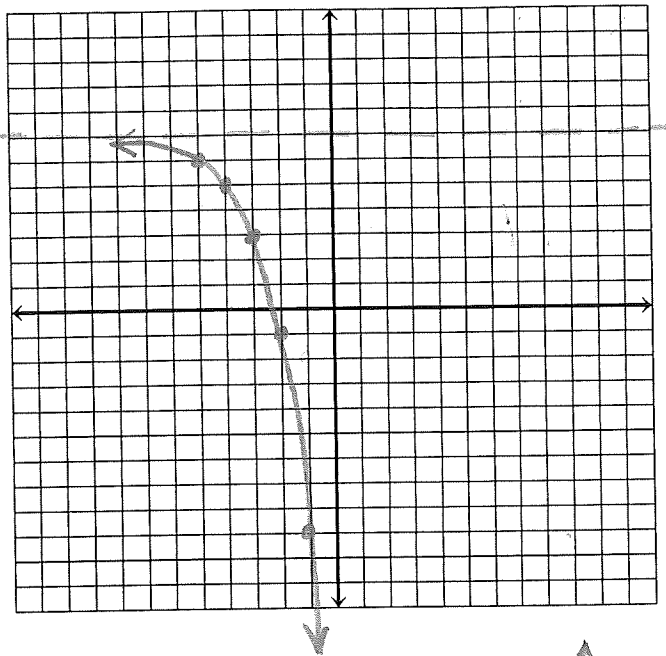
Draw in the asymptote with a dashed line. (3 points)

Parent	
x	y
-2	1/4
-1	1/2
0	1
1	2
2	4
3	8

$x-3$	
x	y
-5	1/4
-4	1/2
-3	1
-2	2
-1	4
0	8

$y(-4)$	
x	y
-5	-1
-4	-2
-3	-4
-2	-8
-1	-16
0	-32

$y+7$	
x	y
-5	6
-4	5
-3	3
-2	-1
-1	-9
0	-25



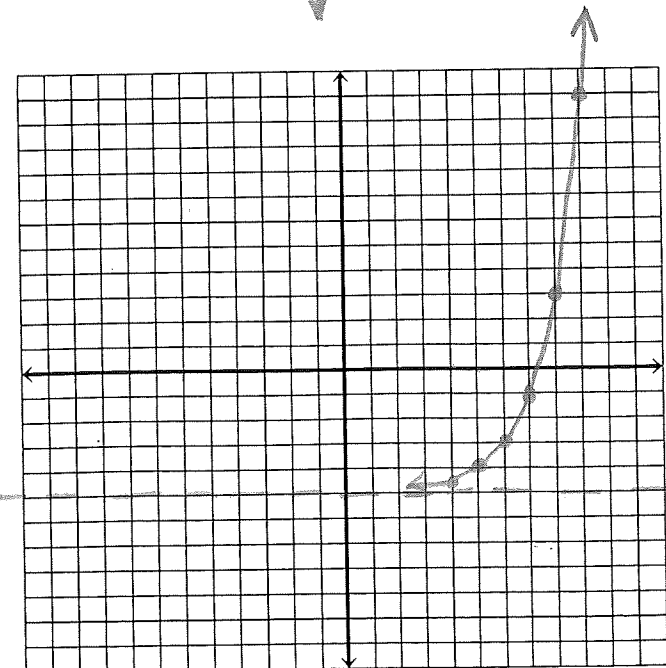
11. $f(x) = 2(2^{x-6}) - 5$

Parent	
x	y
-2	1/4
-1	1/2
0	1
1	2
2	4
3	8

$x+6$	
x	y
4	1/4
5	1/2
6	1
7	2
8	4
9	8

$y(2)$	
x	y
4	1/2
5	1
6	2
7	4
8	8
9	16

$y-5$	
x	y
4	-4 1/2
5	-4
6	-3
7	-1
8	3
9	11



12. What is the y-intercept of $f(x) = (1.75)^x$?

12. 1 / (0, 1) ^{x2}

13. Write the equation in logarithmic form.

a. $5^{-4} = \frac{1}{625}$

$\log_5 \frac{1}{625} = -4$

13. $\log_5 \frac{1}{625} = -4$ ^{x3}

14. Write the equation in exponential form.

a. $\log_7 2401 = 4$

$7^4 = 2401$

14. $7^4 = 2401$ ^{x3}

Solve for v. **SHOW WORK**

15. $\log_8 v = 3$

$8^3 = v$
 $v = 512$

16. $\log_6 v = -1$

$6^{-1} = v$
 $v = \frac{1}{6}$

15. $v = 512$ ^{x2}

16. $v = \frac{1}{6}$ ^{x2}

17. $\log_2 64 = v$

$2^v = 64$
 $v = 6$

18. $\log_v 256 = 4$

$v^4 = 256$
 $v = 4$

17. $v = 6$ ^{x2}

18. $v = 4$ ^{x2}

Evaluate the logarithmic expression. Round your answer to the nearest hundredth. **SHOW WORK**

19. $\log_4 12 + 4$

$\frac{\log 12}{\log 4} + 4$
 $1.79 + 4$

19. 5.79 ^{x2}

Evaluate the logarithmic expression. Round your answer to the nearest hundredth. **SHOW WORK**

20. $\log_3 15$

$\frac{\log 15}{\log 3}$

20. 2.46 ^{x2}

Expand the log expression. Simplify if possible.

21. $\log_6 \frac{36}{a^2}$

$$\log_6 36 - \log_6 a^2$$
$$2 - 2 \log_6 a$$

21. $\underline{2 - 2 \log_6 a} \quad +3$

Expand the log expression. Simplify if possible.

22. $\log_7 49d^4$

$$\log_7 49 + \log_7 d^4$$
$$2 + 4 \log_7 d$$

22. $\underline{2 + 4 \log_7 d} \quad +3$

Expand the log expression. Simplify if possible.

23. $\log_2 \frac{a^3 b^4}{c^5}$

$$\log_2 a^3 + \log_2 b^4 - \log_2 c^5$$
$$3 \log_2 a + 4 \log_2 b - 5 \log_2 c$$

23. $\underline{3 \log_2 a + 4 \log_2 b - 5 \log_2 c} \quad +4$

Rewrite as a single log. Simplify if possible.

24. $2 \log_4 3 - 2 \log_4 x$

$$\log_4 \frac{3^2}{x^2}$$
$$\log_4 \frac{9}{x^2}$$

24. $\underline{\log_4 \frac{9}{x^2}} \quad +3$

Rewrite as a single log. Simplify if possible.

25. $2 \log a + 3 \log b - 2 \log c$

$$\log \frac{a^2 b^3}{c^2}$$

25. $\underline{\log \frac{a^2 b^3}{c^2}} \quad +3$

$\frac{c^2}{a^2 b^3}$