

RACICE Unit 3 Test

Growing, Growing, Growing

Name

Key

Date

Class

The population of Orca whales has been exploding. Suppose that, in the year 1990, there were 10,000 Orcas and that the population was predicted to continue to grow as shown in the table. Use this information to answer # 1-4.

Year (y)	Whales (w)
0 (1990)	10,000
1	13,000
2	16,900
3	21,970
4	28,561
5	37,129.3
6	48,268.09

1. Which equation below models this population pattern?

- A. $w = 10,000 + .3y$ B. $w = 10,000(.3)^y$ C. $w = 10,000(1.3)^y$ D. $y = 10,000(1.3)^w$

2. What is the growth factor for the relationship? Explain how you determined your answer.

1.3 It grows 30% each year on top of the original 100%

3. According to the prediction, what will the whale population be in 1998?

$w = 10,000(1.3)^8 = 81,573$ whales

4. When the population reaches approximately 100,000 whales, the population growth is no longer sustainable. When will this happen? Explain your answer.

9 years

8 years - 81,573

9 years - 106,044

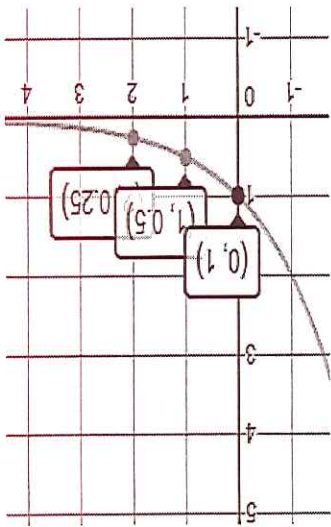
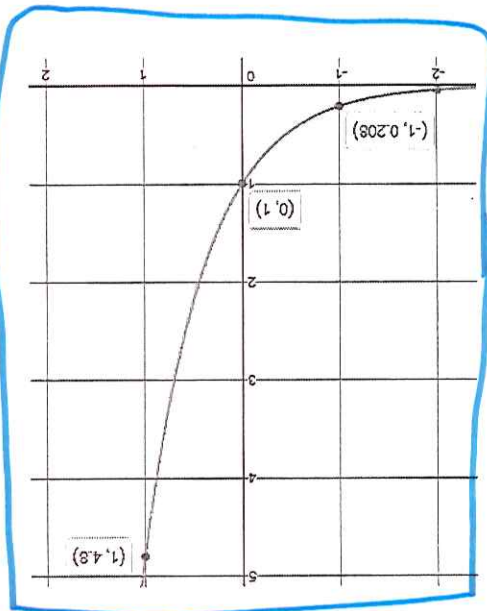
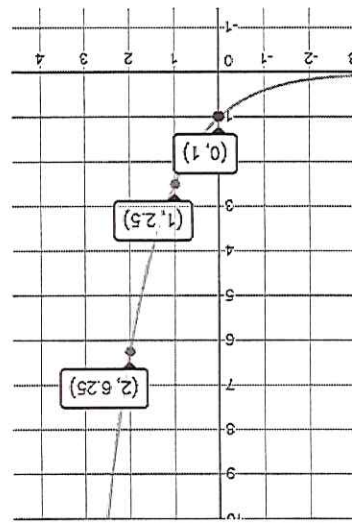
PRACTICE Unit Test (continued)

Name

(/2 pts) 5.

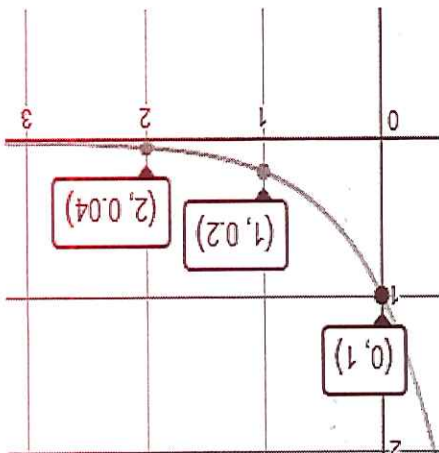
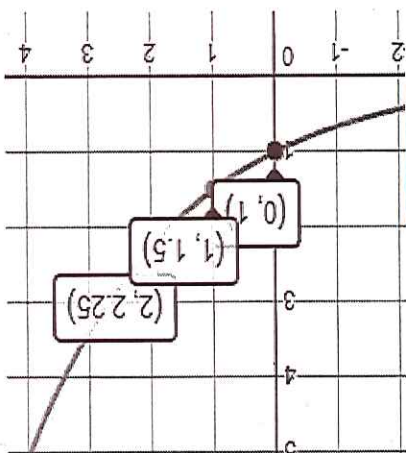
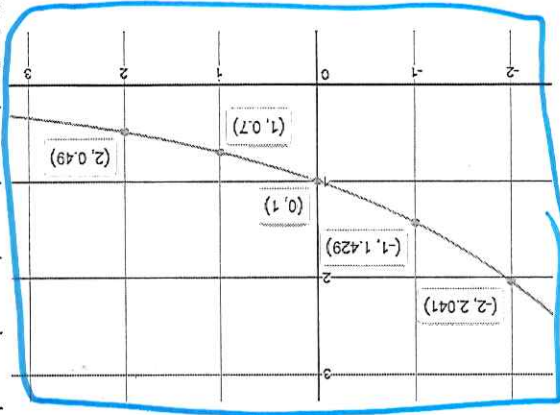
Circle the graph that represents this equation: $y = 1 \cdot 4.8^x$

Is this exponential growth or decay? *Growth*



(/2 pts) 6. Circle the graph that represents this equation: $y = 1 \cdot 0.7^x$

Is this exponential growth or decay? *Decay*



PRACTICE Unit Test (continued)

Bronson Koenig is a basketball player for the Wisconsin Badgers. Every time Bronson Koenig takes a shot, 7% of the air inside the basketball disappears. Each basketball starts with 8.5 pounds of pressure per square inch Use this information to answer #7-9.

(/1 pt) 7. Make a table showing the amount of air left in the basketball after s shots taken.

Shots	Air
0	8.5
1	7.91
2	7.35
3	6.84
4	6.36
5	5.91

(/2 pts) 8. Write an equation for the relationship between the amount of air left in the basketball after s shots taken.

$$y = 8.5(1 - .07)^x$$

$$y = 8.5(.93)^x$$

(/1 pt) 9. How much air is left in the basketball after 15 shots?

$$y = 8.5(0.93)^{15} = 2.86 \text{ lbs per in}^2$$

PRACTICE Unit Test (continued)

A bottle of juice was opened up and left on a picnic table. When it was opened, 3 bumble bees went into the bottle. A minute later, 12 bees were in the bottle. A minute after that, 48 bees were in the bottle.

(/1 pt) 10. Make a table showing how many b bees are in the bottle of juice for each m minute that goes by.

Minute	Bees
0	3
1	12
2	48
3	192
4	768
5	3072
6	12,288

(/2 pts) 11. Identify the initial value and growth factor.

Initial Value: 3
 Growth Factor: 4

(/2 pts) 12. Write an equation for the relationship between the number of minutes m and the amount of bees in the bottle b .

$$b = 3 \cdot 4^m$$

(/1 pt) 13. How are the patterns of change in #7 and #10 alike? Use math vocabulary!

Both Exponential

(/1 pt) 14. How are they #7 and #10 different? Use math vocabulary!

#7 decay
 #10 growth

RATRICE Unit Test (continued)

Use the rules of exponents to simplify expressions.

15. $9^{12} \cdot 9^3$ (/1pt) 9¹⁵

16. $\frac{4^5}{4^2}$ (/1pt) 4³

17. $3^6 \cdot 5^6$ (/1pt) 15⁶

18. $(8^2)^4$ (/1pt) 8⁸

Write each number in scientific notation.

19. 5,632,000,000,000 (/1pt) 5.632 × 10¹²

20. 0.000000958 (/1pt) 9.58 × 10⁻⁷

Write each number in standard form.

21. $4.94 \cdot 10^{-3}$ (/1pt) 0.00494

22. $9.36489 \cdot 10^{13}$ (/1pt) 9364890000000

PRACTICE Unit Test (continued)

Simplify each expression.

1. $(3ad^4)(-2a^2)$

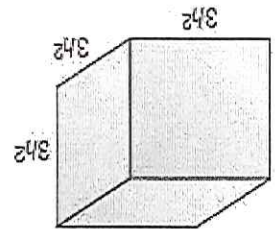
$-6a^3d^4$
 $3(-2)a^2 \cdot d^4$

2. $(-3x^2y)(4x^4)$

2. $-12x^6y$

3. $[(5^2)^2]^3$

3. 5^{12}



4. Express the simplified volume of the prism. (Hint: $V = LWH$)

4. $27h^6$

Simplify each expression. Remember your final answers should include only positive exponents.

5. $\frac{8y^7z^5}{4y^5z^5}$

5. $2yz$

PRACTICE Unit Test (continued)

6. $p(q^{-2})(r^{-3})$

6. $\frac{p}{q^2 r^3}$ (/2)

7. $\left(\frac{6m^5}{7p^6 q^3} \right)^2$

$\frac{36 m^{10}}{49 p^{12} q^6}$

7. $\frac{36 m^{10}}{49 p^{12} q^6}$ (/2)

8. $\frac{22r^5 s^2 w^8}{11r^{-2} s^2 w^{-3}}$

8. $2r^7 w^{11}$ (/2)

