Date 2-1-17 Class 3rd/4th

Growing, Growing, Growing

Unit Test

100

1. The population of Alaskan Reindeer has been exploding. Suppose that, in the year 2010, there were 2,000 Alaskan Reindeer and that the population was predicted to continue to grow as shown in the table.

Year (y)	Reindeer (r)
0 (2010)	2,000
1	2,200
2	2,420
3	2,662
4	2,928
5	3,221
6	3,543

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a. Which equation below models this population pattern?

A. $R = 2{,}000(0.1^y)$ (**B.**) $R = 2{,}000(1.1^y)$ **C.** $R = 2{,}000 + 200^y$ **D.** $R = 2{,}000^y$

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

The growth factor is 1.1 because the equation is 2000 (1.1^y) and 2000 is the initial value so 1.1 has to be the growth factor.

c. According to the prediction, what will the reindeer population be in 2017?

In 2017 the population will be 3897 reindeer.

d. When the population reaches approximately 5,000 reindeer, the population growth is no longer sustainable. When will this happen? Explain your answer.

The population will reach 5000 between 2019 and 2020 because if you do the equation 2000 (1.1^10) you get 5187.

Unit Test (continued)

2. Belinda has a plan for distributing prize money for a trivia contest. For the first correct response, the contestant will receive \$500. For the second correct response, the contestant will receive an additional \$100, for a total of \$600. For the third correct response, the contestant will receive \$100 more, for a total of \$700. Belinda's plan continues in this pattern.

a. Make a table showing the amount of money a contestant would receive for answering questions 1 through 6 correctly.

c Questions	m Money
1	500
2	600
3	700
4	800
5	900
6	1000

b. Make a graph of the data in your table.

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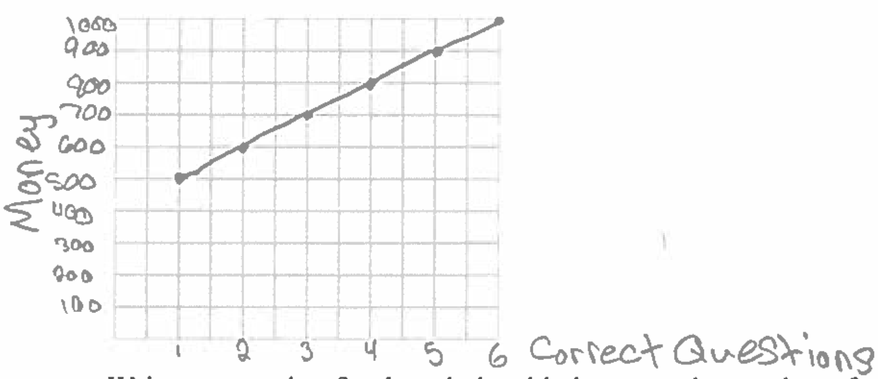

c. Write an equation for the relationship between the number of correct responses c and the amount of money the contestant will receive m.

$y = mx + b$

$m = 100c + 400$

Unit Test (continued)

3. Monty has a different plan for distributing prize money for the trivia contest. The contestant will receive $5 for the first correct response. For the second correct response, the total winnings will increase to $25. For the third correct response, the total winnings will increase to $125, and so on.

a. Make a table showing a contestant's earnings for answering questions 1 through 6 correctly.

Questions	Money
1	5
2	25
3	125
4	625
5	3125
6	15625

b. Make a graph of the data in your table.

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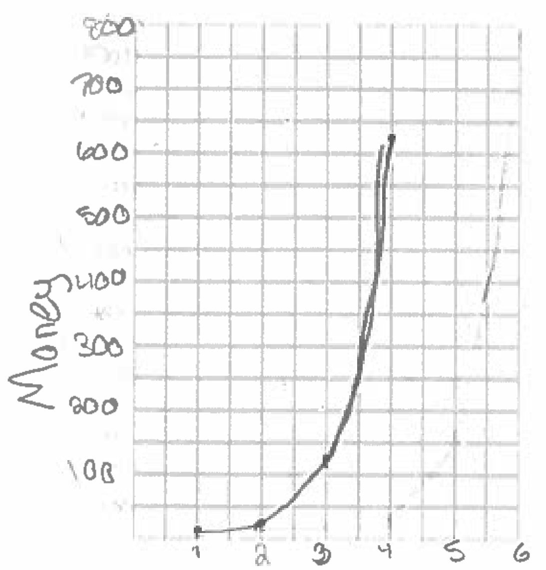

c. Write an equation for the relationship between the number of correct responses c and the amount of money the contestant will receive m.

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

Unit Test (continued)

4. How are the patterns of change in Belinda's and Monty's plans (Questions 2 and 3) alike? How are they different?

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In Belinda and Monty's plans the pattern of change is different where Belinda increases by $100 each questiona[l] Monty multiplies by 5 each question, and Belinda has a linea[r] function while Monty has a exponentia[l] function.

5 a. Decide whether each of the following statements is true or false.

Problem	True or False
1. $25^{100} \times 25^{10} = 25^{1000}$	False
2. $4^{9} \times 5^{9} = 20^{9}$	True
3. $(3^{6})^{8} = 3^{48}$	True
4. $\frac{10^{6}}{10^{2}} = 10^{3}$	False
5. $7^{0} = 1$	True
6. $8^{4} = 32$	False
7. $4^{-2} = -16$	False

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b. Choose one of the false statements above and change it to a correct statement. Explain why your answer is correct.

$25^{100} \times 25^{10} = 25^{110}$

This is true because if the bases are the same you keep them, and if the exponents are different you add them. The bases are both 25 so it stays the same and the exponents are different so you add, 100 + 10 = 110.

6. Simplify the following expression. Express your answer in scientific notation.
$(4.0 \times 10^{4})(1.6 \times 10^{5})$

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$(4.0 \times 1.6)(10^{4} \times 10^{5})$

6.4×10^{9}

Name .... Date .... Class ....

Unit Test (continued)

7. Approximately 7.5 x 10^5 gallons of water flow over a waterfall each second. There are 8.6 x 10^4 seconds in one day. Approximately how many gallons of water will flow over the waterfall in one day. Show your work.

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$(7.5\times10^5)(8.6\times10^4)$

$(7.5\times8.6)(10^5\times10^4)$

64.5×10^9

6.45×10^{10}

8. Which expressions are equivalent to $\frac{1}{2^6}$?

Select **all** that apply.

Ⓐ $2^{-5}\cdot2^{-1}$

Ⓑ $2^{-3}\cdot2^{2}$

Ⓒ $2^{-2}\cdot2^{-4}$

Ⓓ $2^{1}\cdot2^{5}$

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Ⓔ $2^{1}\cdot2^{6}$

Ⓕ $2^{2}\cdot2^{-8}$

Ⓖ $2^{3}\cdot2^{3}$

Name .... Date .... Class ....

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Unit Test (continued)

9. The table contains seven measurements written in decimal and scientific notation.
   (a) Complete the table so that each measurement is written in *both* decimal *and* scientific notation.
   (b) In the last column, rank the measurements in order of size.
   (1 = smallest, 2 = next smallest, and so on up to 7 = largest)

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Decimal Notation		Scientific Notation	Rank 1 = smallest 7 = largest
6m	=	6×10^0 m	4.
120,000 m	=	1.2×10^5 m	7.
0.0012 m	=	1.2×10^{-3} m.	2.
300 m	=	3×10^2 m	5.
0.6 m	=	6×10^{-1} m.	3.
0.0009 m	=	9×10^{-4} m	1
6000 m	=	6×10^3 m	6