

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Simplify:

$$(\sqrt{5})^{-4}$$

- A.  $-100$     B.  $-25$     C.  $\frac{1}{100}$     D.  $\frac{1}{25}$

2. Simplify:  $9\sqrt{32} - 3\sqrt{18} + 6\sqrt{50}$

- A.  $-75\sqrt{2}$     B.  $-57\sqrt{2}$     C.  $57\sqrt{2}$     D.  $75\sqrt{2}$

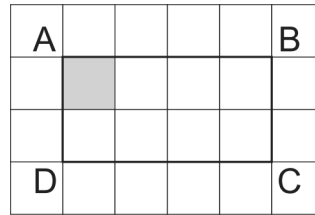
3. The equation  $h = 241m^{-\frac{1}{4}}$  predicts a mammal's heart rate,  $h$ , in beats per minute, based on the mammal's mass,  $m$ , in kilograms. What is the *approximate* heart rate, in beats per minute, of a polar bear with a mass of 326 kilograms?

- A. 57    B. 67    C. 82    D. 92

4. Jenna got an answer of about 2.88 when she entered 24 on her calculator and pressed the  $\sqrt[3]{\phantom{x}}$  key. As usual, she stopped to think briefly about whether or not her calculator's answer was reasonable. Which of the following statements is the most likely explanation for her to believe that her calculator's answer is or is not reasonable?

- A. It is not reasonable, because the answer should be a whole number.  
 B. It is reasonable because 2 cubed is 8 while 3 cubed is 27.  
 C. It is not reasonable because the answer should be only slightly more than 2.  
 D. It is reasonable, because 24 is an even number.

5. Use the figure below to answer the following question.



If the area of the shaded square is  $5 \text{ cm}^2$ , what is the perimeter of figure ABCD?

- A.  $8\sqrt{5} \text{ cm}$     B. 40 cm  
 C.  $12\sqrt{5} \text{ cm}$     D. 60 cm

6. The following exponential function describes the growth of a certain plant cell in  $t$  hours.

$$p(t) = 3 \cdot 16^t$$

How many plant cells are there after  $\frac{3}{4}$  hour?

- A. 12    B. 18    C. 24    D. 36

7. If  $\log_{10} x = -2$ , what is the value of  $x$ ?

- A.  $x = -\sqrt{\frac{1}{10}}$     B.  $x = \sqrt{\frac{1}{10}}$   
 C.  $x = \frac{1}{100}$     D.  $x = 100$

8. Which equation is equivalent to  $\log_3 \frac{1}{9} = x$ ?

- A.  $\frac{1^3}{9} = x^3$     B.  $(\frac{1}{9})^3 = x$   
 C.  $3^x = \frac{1}{9}$     D.  $3^{\frac{1}{9}} = x$

9. If  $\log_x y = 2$ , which of the following is true?

- A.  $y = x^2$     B.  $y = 2x$     C.  $x = y^2$     D.  $x = 2y$

10. A certain radioactive element decays over time according to the equation  $y = A \left(\frac{1}{2}\right)^{\frac{t}{300}}$  where  $A =$  the number of grams present initially and  $t =$  time in years. If 1000 grams were present initially, how many grams will remain after 900 years?

- A. 500 grams                      B. 250 grams  
C. 125 grams                      D. 62.5 grams

11. Bacteria in a culture are growing exponentially with time, as shown in the table below.

**Bacteria Growth**

Day	Bacteria
0	100
1	200
2	400

Which of the following equations expresses the number of bacteria,  $y$ , present at any time,  $t$ ?

- A.  $y = 100 + 2^t$                       B.  $y = (100) \cdot (2)^t$   
C.  $y = 2^t$                                 D.  $y = (200) \cdot (2)^t$

12. If the equation  $y = 2^x$  is graphed, which of the following values of  $x$  would produce a point closest to the  $x$ -axis?

- A.  $\frac{1}{4}$                       B.  $\frac{3}{4}$                       C.  $\frac{5}{3}$                       D.  $\frac{8}{3}$

13. Which table below correctly describes points of the exponential function  $f(x) = 3^{-x} - 2$ ?

A. 

$x$	-2	-1	0
$f(x)$	-18	-6	-2

B. 

$x$	-2	-1	0
$f(x)$	-4	-5	-2

C. 

$x$	-2	-1	0
$f(x)$	$-1\frac{8}{9}$	$-1\frac{2}{3}$	-1

D. 

$x$	-2	-1	0
$f(x)$	7	1	-1

14. In 1997 the population of a small town was 700. If the annual rate of increase is about 0.8%, which value below expresses the population five years later?

- A.  $5(700)(0.008)$                       B.  $5(700)(1.008)$   
C.  $(700)(0.008)^5$                       D.  $(700)(1.008)^5$

15. Judy works for a doctor. She placed a sample of bacteria in a culture dish and recorded the number of bacteria present each 30 minutes beginning at 12:00 P.M. The table shows Judy's data.

**Bacterial Growth**

Time	Number of Bacteria Present
12:00 P.M.	150
12:30 P.M.	600
1:00 P.M.	2400

If the pattern of bacterial growth remains constant, how many bacteria should be present in the culture dish at 2:00 P.M.?

16. An ad for a special baseball card that was posted on the Internet claims that the value of the card "doubles every year." Jerome buys the card for \$40 at the end of the year 2001. If the value of the card does indeed double every year, in what year will the value of the card first reach \$5000?

17. Suppose a hospital patient receives a medication that is used up in the body according to the equation  $M = 200(0.8^t)$  with  $M$  in milligrams and  $t$  in hours.

What does the 0.8 represent in the equation?

- A. The medication is used up in 0.8 hours.  
B. The medication is used up at 0.8 milligrams per hour.  
C. The patient started out with 0.8 milligrams of medication.  
D. There is 80% of the medication remaining after each hour.

18. Trevor writes the equations shown.

$$y = ax$$
$$y = a^x$$

Which statement correctly compares the rate of change for the two equations?

- A. Both rates of change vary.
- B. Both rates of change are constant.
- C. The rate of change of  $y = ax$  is constant, and the rate of change of  $y = a^x$  varies.
- D. The rate of change of  $y = a^x$  is constant, and the rate of change of  $y = ax$  varies.
19. Isabel began training for a marathon by running 3 miles during her first week. Each week, she increased the distance she ran by 10% of the previous week's distance.

Which function represents the number of miles she ran during the  $n$ th week?

- A.  $f(n) = 3(1.1)^{n-1}$
- B.  $f(n) = 3 + 1.1^{n-1}$
- C.  $f(n) = 3(1.1)(n - 1)$
- D.  $f(n) = 3 + (1.1)(n - 1)$
20. Use the equation below to answer the following question.

As the value of  $x$  becomes negative and continues to decrease, what happens to the value of  $y$ ?

$$y = 2^x$$

- A.  $y$  becomes negative      B.  $y$  gets closer to 1
- C.  $y$  gets closer to 0      D.  $y$  gets closer to  $x$

21. On January 1, 2000, a car had a value of \$15,000. Each year after that, the car's value will decrease by 20 percent of the previous year's value. Which expression represents the car's value on January 1, 2003?
- A.  $15,000(0.8)^3$       B.  $15,000(0.8)^4$
- C.  $15,000(0.2)^3$       D.  $15,000(0.2)^4$
22. The table below shows the total number of possible outcomes when tossing different numbers of coins.

**Coin Toss**

Number of Coins	Different Possible Outcomes
1	2
2	4
3	8
⋮	⋮
?	64

What is the exact number of coins that can be tossed to obtain a total of 64 different possible outcomes?

23. The student population in the Greenville school system is increasing about 10% each year. This year there are 3120 students in the Greenville school system. If this trend continues, which of the following is closest to the number of students who will be in this school system 3 years from now?
- A. 3400      B. 4000      C. 4200      D. 9400

Final Exam Review, Unit 3      12/30/2013

- |         |               |         |   |
|---------|---------------|---------|---|
| 1.      |               | 21.     |   |
| Answer: | D             | Answer: | A |
| 2.      |               | 22.     |   |
| Answer: | C             | Answer: | 6 |
| 3.      |               | 23.     |   |
| Answer: | A             | Answer: | C |
| 4.      |               |         |   |
| Answer: | B             |         |   |
| 5.      |               |         |   |
| Answer: |               |         |   |
| 6.      |               |         |   |
| Answer: | C             |         |   |
| 7.      |               |         |   |
| Answer: | C             |         |   |
| 8.      |               |         |   |
| Answer: | C             |         |   |
| 9.      |               |         |   |
| Answer: | A             |         |   |
| 10.     |               |         |   |
| Answer: | C             |         |   |
| 11.     |               |         |   |
| Answer: | B             |         |   |
| 12.     |               |         |   |
| Answer: | A             |         |   |
| 13.     |               |         |   |
| Answer: | D             |         |   |
| 14.     |               |         |   |
| Answer: | D             |         |   |
| 15.     |               |         |   |
| Answer: |               |         |   |
| 16.     |               |         |   |
| Answer: | [answer grid] |         |   |
| 17.     |               |         |   |
| Answer: | D             |         |   |
| 18.     |               |         |   |
| Answer: | C             |         |   |
| 19.     |               |         |   |
| Answer: | A             |         |   |
| 20.     |               |         |   |
| Answer: | C             |         |   |