Name: _____   Date: _____

<center># UNIT #5– EXPONENTIAL AND LOGARITHMIC FUNCTIONS
MATH III HONORS ASSESSMENT</center>

1. The expression $\left(\dfrac{1}{x^3}\right)^2$ is equivalent to

   (1) x^{-1} (3) x^{-5}

   (2) $x^{2/3}$ (4) x^{-6}

   _____

2. The exponential function $y = 16\left(2^x\right)$ could be rewritten as

   (1) $y = 32^x$ (3) $y = 2^{x+4}$

   (2) $y = 2^{5x}$ (4) $y = 2^{x^3}$

   _____

3. The expression $a^{\frac{5}{2}}$ is equivalent to which of the following as long as $a > 0$?

   (1) $\sqrt{a^5}$ (3) $\sqrt[5]{a^2}$

   (2) $\sqrt{5a}$ (4) $\dfrac{5a}{2}$

   _____

4. Which of the following would give the same result as $\left(\sqrt{\sqrt[3]{2}}\right)^4$?

   (1) $\sqrt[5]{8}$ (3) $\sqrt{2}$

   (2) $\sqrt[4]{8}$ (4) $\sqrt[3]{4}$

   _____

5. For the function $f(x) = 5(2)^x + 7$, which of the following represents its y-intercept?

   (1) 7   (3) 12

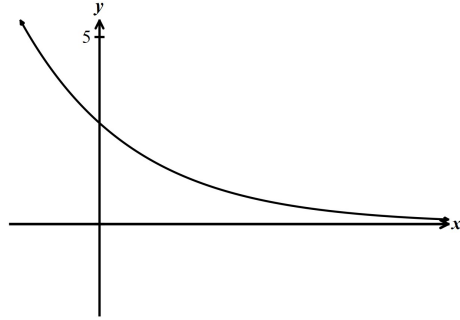   (2) 5   (4) 17

   _____

6. Which of the following could be the equation of the graph shown below?

(1) $y = 10(0.5)^x$

(2) $y = 3(0.75)^x$

(3) $y = 4(1.25)^x$

(4) $y = 5(2.2)^x$

_____

7. Which of the following values of x solves: $(0.5)^{3x+2} = 8^{5x-4}$?

(1) $\dfrac{2}{3}$ (3) 3

(2) $\dfrac{5}{9}$ (4) 7

_____

8. A population of fruit flies is increasing at a rate of 22.5% per hour. If the population had an original size of 10 flies, then which of the following is its size after one day?

(1) 798   (3) 1122

(2) 935   (4) 1304

_____

9. The water level in a draining reservoir is changing such that the depth of water decreases by 7.5% per hour. If the water starts at a depth of 45 feet, then which of the following functions properly models the depth, d, as a function of time, t, in hours since it started draining?

(1) $d = 45(.075)^t$ (3) $d = 45(7.5)^t$

(2) $d = 45(.925)^t$ (4) $d = 45(92.5)^t$

_____

10. The temperature of a cooling liquid in a room held at a constant 75 degrees Fahrenheit can be described by the equation $F(t) = 132(.97)^t + 75$, where F is the Fahrenheit temperature and t is the amount of time it has been cooling, in minutes. Which of the following was the original temperature of the liquid when it began cooling?

(1) 75   (3) 203

(2) 132   (4) 207

_____

11. If a population grows at a constant rate of 2.8% per year, then by what percent will it grow over the next 10 years?

(1) 17%   (3) 32%

(2) 28%   (4) 39%

_____

12. Which of the following is closest to the value of $\log_4(40)$?

(1) 1.8   (3) 2.7

(2) 2.3   (4) 3.5

_____

13.   If $b > 0$ then $\log_b\left(\dfrac{1}{b^3}\right)$ is equal to

(1) $\dfrac{1}{3}$ (3) 3

(2) $\dfrac{b}{3}$ (4) -3 _____

14. Given the function $f(x) = \log_2(2x-8)$, which of the following values of x is *not* in the domain of the function?

(1) $x = 5$ (3) $x = 8$

(2) $x = 2$ (4) $x = 20$

_____

15. Which of the following is equivalent to $\log\left(\dfrac{x^2}{\sqrt{y}}\right)$?

(1) $(\log x)^2 - \sqrt{\log y}$ (3) $\dfrac{2\log x - \log y}{2}$

(2) $\dfrac{2\log x}{\sqrt{\log y}}$ (4) $\dfrac{4\log x - \log y}{2}$

_____

16. If $\log_b(5) = 1.2$ then $\log_b(125) = ?$

    (1) 0.4   (3) 3.6

    (2) 1.728   (4) 30   _____

17. If $5b^{x-3} = 7$ then $x =$

    (1) $\dfrac{\log_b(7)}{5} + 3$ (3) $3 + \log_b(1.4)$

    (2) $\dfrac{5b}{7} - 3$ (4) $3b^{7/5}$ _____

18. If $f(x) = 50(0.92)^x + 75$ then which of the following values of x solves the equation $f(x) = 90$?

    (1) 12.1   (3) 15.8

    (2) 14.4   (4) 18.3   _____

19. If \$500 is placed in a savings account that earns a 6% nominal interest compounded monthly, then which of the following represents the account's worth after 10 years?

    (1) \$800.00   (3) \$895.42

    (2) \$873.29   (4) \$909.70   _____

20. The temperature of a cooling liquid is given by the function $T(m) = 38(0.82)^m + 21$, where T represents the temperature in degrees Celsius and m represents the number of minutes, $m \geq 0$, that the liquid has been cooling. Which of the following represents a temperature that the liquid does not reach as it cools down?

    (1) 53   (3) 41

    (2) 16   (4) 28   _____