***Math 3200***

***Chapter 7 Test: Exponential Functions Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

***total - 36 pts Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

Part A - Multiple Choice. Please put the letter of the best choice on the answer spaces provided at the end of the multiple choice section. (14 pts)

1. Which function produces a decay curve?

(A)  (B)  (C)  (D) 

2. What is the equation of the horizontal asymptote of the graph of ?

 (A)  (B)  (C)  (D) 

3. A car depreciates by 15% every 3 years. If the car cost $28,000 when

purchased, which equation best represents the value (*y*) of the car after n years?

 (A)  (B) 

 (C)  (D) 

4. If you invest $2000 and earn 2% interest compounded annually, how much

will you have in 17 years?

 (A) $2800.48 (B) $2034.00 (C) $44372.22 (D) $2680.00

5. Which graph best represents the exponential function(  and )?

 (A) (B) (C) (D)



6. The coordinates of the y intercept for  are \_\_\_.

 (A) (0,3) (B) (0,2) (C) (0,-2) (D) (0,-1)

7. If the base equation  is transformed and the new equation is

what transformations have occurred?

(A) Horizontal stretch of  and reflected in the line .

(B) Horizontal stretch of  , reflected in x axis, and translated 6 units up.

(C) Horizontal stretch of  , reflected in the y-axis, and translated 6 units up.

(D) Horizontal stretch of , reflected in the x axis, and translated 6 units down.

8. What is the range of the function $y=-\frac{2}{3}(5)^{x}-4$?$ $

(A)  (B)  (C)  (D) 

9. The function  describes the relationship between the temperature,

 T, in oC, of a cup of hot chocolate and time, t, in seconds. What would be the temperature

 of the hot chocolate after 10 s?

 (A) 39.2 ºC (B) 59.2 ºC (C) 48 ºC (D) 76 ºC

10. The function  represents the temperature, *T*, of the coolant in ºC, in a car *t* minutes after being turned off. If the car was parked outside, what was the temperature that day?

 (A) 93 ºC (B) 78 ºC (C) 15 ºC (D) 61.8ºC

11. What is the value of x in the equation 42x+1 = 19?

 (A) -0.16 (B) 0.56 (C) 1.12 (D) 2.12

12. Given , what is the value of *x* when ?

 (A) 2 (B) 3 (C) 3.5 (D) 12 582 920

13. What is the mapping for the exponential function if the base

 function is ?

 (A)  (B) 

 (C)  (D) 

14. Write as a single power: $\frac{\left(25\right)^{n-1}\left(125\right)^{2n+3}}{5^{n-4}}$

(A) $5^{2n+6}$ (B) $5^{2n-2}$ (C) $5^{7n-3}$ (D) $5^{7n+11}$

**PART A - Answers [14 pts]**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  1. \_\_\_\_\_ |  2. \_\_\_\_\_ |  3. \_\_\_\_\_ |  4. \_\_\_\_\_ |  5. \_\_\_\_\_ |  6. \_\_\_\_\_ |  7. \_\_\_\_\_ |
|  8. \_\_\_\_\_ |  9. \_\_\_\_\_ | 10. \_\_\_\_\_ | 11. \_\_\_\_\_ | 12. \_\_\_\_\_ | 13. \_\_\_\_\_ | 14. \_\_\_\_\_ |

PART B: Show all workings in the spaces provided. (23 pts)

1. A)

 You want to invest $1000 and the investment firm you are dealing with gives you

 two options:

 option1 - a rate of 6.75% compounded annually

 option2 - an annual rate of 6.35% compounded quarterly

 Which option is better for you if you plan to lock in the investment for 20 years? You must

 write and use an algebraic equation to answer this question. (3 pts)

 B) You drink a carbonated beverage with 120 mg of caffeine. Every  hour the caffeine

 in your system decreases by 50%. How long will it take until you have 15 mg of caffeine

 still in your system? You must write and use an algebraic equation to model this situation.

 Solve algebraically.

(4 pts)

2. Solve **BOTH** of these exponential equations algebraically: (4 pts each)

 A)  B) $\left(\frac{1}{8}\right)^{x}=\frac{16^{2x}}{4^{5x+2}}$

3. Given the exponential function , determine the following: (8 pts)

 (a) Mapping Rule:

(b) The missing values for the base table below given the **base equation .**



(c) **Use** the mapping rule stated in part(a) to find the **image** of the 4 ordered pairs

from part (b). 

(d) Range of given function:

(e) y–intercept of the given function:

 (e) Sketch the given function only. Clearly show the horizontal asymptote and label any important features of the graph.

