**Mathematics 3201**

**Unit 6: Exponential Functions**

**Unit Assessment**

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

**Section 1: Selected Response (32 points)**

**Circle the letter of the correct answer.**

1. Which represents an increasing function?

|  |  |  |  |
| --- | --- | --- | --- |
| A) f(x) = | B) f(x) = | C) f(x) = 2(1)x | D) f(x) = |

2. What is the y-intercept of: f(x) = 5(2)x?

|  |  |  |  |
| --- | --- | --- | --- |
| A) (0, 2) | B) (0, 5) | C) (0, 10) | D) (0, 0) |

3. Which exponential function represents the graph shown?

|  |  |  |
| --- | --- | --- |
| A) | C) |  |
| B) | D) |

4. What is the range of f(x) = 4(3)x ?

|  |  |  |  |
| --- | --- | --- | --- |
| A) | B) | C) | D) |

5. What is the domain of f(x) = ?

|  |  |  |  |
| --- | --- | --- | --- |
| A) | B) | C) | D) |

6. What is the exponential function for the data given:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | -1 | 0 | 1 | 2 | 3 |
| f(x) | 81 | 27 | 9 | 3 | 1 |

|  |  |  |  |
| --- | --- | --- | --- |
| A) | B) | C) | D) |

7. Solve for x: 52x+1 = 1253x

|  |  |  |  |
| --- | --- | --- | --- |
| A) | B) | C) | D) 7 |

8. Solve for x: 23x =

|  |  |  |  |
| --- | --- | --- | --- |
| A) | B) | C) 1 | D) 2 |

9. What is the value of x if f(x) in the equation

|  |  |  |  |
| --- | --- | --- | --- |
| A) | B) | C) | D) 3 |

10. What is the true of the table given below?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x(years) | 0 | 2 | 4 | 6 | 8 |
| y(amount) | 10 | 30 | 90 | 270 | 810 |

|  |  |  |
| --- | --- | --- |
|  | Initial Amount | Amount Growth |
| A) | 10 | doubles every three years |
| B) | 10 | triples every two years |
| C) | 20 | doubles every three years |
| D) | 20 | triples every two years |

11. The function that models the decay of carbon-14 is where *A*(*t*) is the number of grams of carbon-14 present at time *t*, in years. Which statement is true?

A) The amount of carbon-14 doubles every 5730 years.

B) There are 100 g of carbon-14 present initially.

C) 25 g will be present after 50 years.

D) 25 g of carbon-14 will be present after 5730 years.

12. A = 1000(1.09)4 represents a bank loan that is compound annually. What is the interest rate?

|  |  |  |  |
| --- | --- | --- | --- |
| A) 1000% | B) 9% | C) 81% | D) 4% |

13. Rick’s car valued at $22,600 depreciates in value by 16% per year. Which equation represents the car’s value after 5 years?

|  |  |  |  |
| --- | --- | --- | --- |
| A) | B) | C) | D) |

14. Joel invested $5000 in a savings account that pays 6%/a compounded quarterly. Which equation represents how much money Joel has after 6 years?

|  |  |  |  |
| --- | --- | --- | --- |
| A) | B) | C) | D) |

15. The following data shows exponential growth. Determine the missing value in the given table.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *x* | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| *y* | 3 | 6 | 12 | 24 | 48 | x | 192 | 384 |

|  |  |  |  |
| --- | --- | --- | --- |
| A) 72 | B) 96 | C) 104 | D) 144 |

16. A scatter plot is drawn using a data set. Identify the equation of the

curve of best fit.

|  |  |  |
| --- | --- | --- |
| A) f(x)= 4.8(1.08)x | C) f(x) = 8.4(0.81)x |  |
| B) f(x) = 4.8(0.81)x | D) f(x) = 8.4(1.08)x |

**Section 2: Constructed Response (40 points)**

**Answer all the questions showing all your work.**

1. Complete the table below: (12 points)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Characteristics | f(x) = 5x | f(x) = 3(2)x |  |  |
| Number of x-intercepts |  |  |  |  |
| y-intercept |  |  |  |  |
| End Behaviour |  |  |  |  |
| Domain |  |  |  |  |
| Range |  |  |  |  |
| Increasing or Decreasing |  |  |  |  |



2. For the following graph determine: (6 points)

A) y-intercept - \_\_\_\_\_\_\_

B) the end behaviour - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

C) the domain - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

D) the range - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

E) Increasing or Decreasing Function - \_\_\_\_\_\_\_\_\_

F) Is the parameter “b” in the equation of the function greater than 1 or between 0 and 1? Provide your reasoning.

3. Solve each exponential equation. (12 marks)

|  |  |
| --- | --- |
| A) 2(3)x = 54 | B) |
| C) | D) |

4. Joanne invested $5000 in a savings account that pays 7% per year compounded quarterly.

A) Write an equation to represent the above situation. (3 points)

B) How much money will Joanne have after 2 years? (2 points)

5. Samuel’s car currently valued at $32000, depreciates in value by 18% per year.

A) Write an equation to represent the above situation. (3 points)

B) What will the car be worth in 4 years? (2 points)