Mathematics 3201
Unit 6: Exponential Functions
Unit Assessment

Name:_____

Section 1: Selected Response (32 points)
Circle the letter of the correct answer.

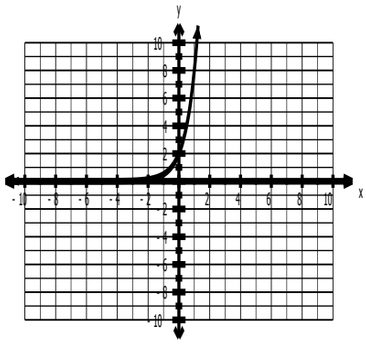
1. Which represents an increasing function?

A) f(x) = $\frac{1}{3}\left(\frac{4}{5}\right)^x$ B) f(x) = $2\left(\frac{2}{3}\right)^x$ C) f(x) = $2(1)^x$ D) f(x) = $\frac{1}{2}(3)^x$

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) $f(x) = 4(2)^x$ C) $f(x) = 2(4)^x$

B) $f(x) = 4\left(\frac{1}{2}\right)^x$ D) $f(x) = 3\left(\frac{1}{2}\right)^x$

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

A) $y > 4$ B) $y \geq 4$ C) $y > 0$ D) $y \geq 0$

5. What is the domain of f(x) = $\frac{1}{2}\left(\frac{3}{4}\right)^x$?

A) $x \geq \frac{1}{2}$ B) $x \in R$ C) $x > \frac{3}{4}$ D) $x > 0$

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

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

A) $f(x) = 27\left(\frac{1}{3}\right)^x$ B) $f(x) = 81\left(\frac{1}{3}\right)^x$ C) $f(x) = 27(3)^x$ D) $f(x) = 81(3)^x$

7. Solve for x: $5^{2x+1} = 125^{3x}$

A) $\frac{1}{8}$ B) $\frac{1}{7}$ C) $\frac{1}{4}$ D) 7

8. Solve for x: $2^{3x} = \sqrt{4}^{x+1}$

A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) 1 D) 2

9. What is the value of x if f(x) in the equation $81 = 3^{-3(x+2)}$

A) $\frac{-10}{3}$ B) $\frac{-2}{3}$ C) $\frac{3}{5}$ 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 $A(t) = 50\left(\frac{1}{2}\right)^{\frac{t}{5730}}$ 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) $V = 22600(1.16)^5$ B) $V = 22600(0.16)^5$ C) $V = 22600(0.84)^5$ D) $V = 22600(1.84)^5$

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?

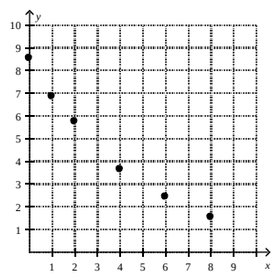
A) $V = 5000(1.05)^6$ B) $V = 5000(1.025)^6$ C) $V = 5000(1.0125)^6$ D) $V = 5000(1.004)^6$

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) $f(x) = 8.4(0.81)^x$

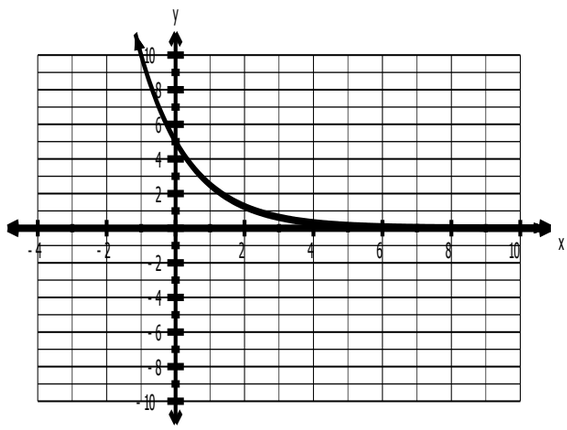
B) $f(x) = 4.8(0.81)^x$ D) $f(x) = 8.4(1.08)^x$

Section 2: Constructed Response (40 points)
Answer all the questions showing all your work.

1. Complete the table below: (12 points)

Characteristics	$f(x) = 5^x$	$f(x) = 3(2)^x$	$f(x) = \left(\frac{1}{2}\right)^x$	$f(x) = 4\left(\frac{1}{3}\right)^x$
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) $2^{x+1} = \sqrt{32}$

C) $25^{(x-3)} = \frac{1}{125}$	D) $2\left(\frac{1}{3}\right)^{2x} = 18$

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)