

Math 3206
Test 1 – Unit 3: Exponential Functions

Name: _____

Part 1:

Multiple Choice

{24 marks}

1 Which sequence below represents an exponential sequence?

- A) {2, 6, 10, 14, 18, . . .}
- B) {3, 5, 9, 16, 24, . . .}
- C) {4, 8, 24, 96, . . . }
- D) {256, 64, 16, 4, . . .}

2 Which equation represents a geometric sequence?

- A) $y = 2x + 3$
- B) $y = x^2 + 5x - 6$
- C) $y = x^3 - 1$
- D) $y = 4^x + 3$

3 Which equation below will produce a decay curve?

- A) $y = 3^x - 4$
- B) $y = 2(4)^x$
- C) $y = \frac{1}{2}(3)^x$
- D) $y = 6(\frac{1}{3})^x$

4 What is the equation of the relationship below?

x	-2	0	2	4
y	8	24	72	216

- A) $y = 8(3)^{x/2}$
- B) $y = 8(\frac{1}{3})^x$
- C) $y = 24(3)^x$
- D) $y = 24(3)^{x/2}$

For the equation below $y = 2.5^x - 6$, answer questions 5 to 7.

5 What is the equation of the horizontal asymptote?

- A) $y = -6$
- B) $y = -3.5$
- C) $y = 0$
- D) $y = 2.5$

6 What is the y-intercept of the graph?

- A) -6
- B) -5
- C) -3.5
- D) 2.5

7 What is the range of the function?

- A) $\{x|x > -6, x \in R\}$
- B) $\{x|x > 0, x \in R\}$

- C) $\{y|y > -6, y \in R\}$
 D) $\{y|y > 0, y \in R\}$
- 8 A coffee is sitting on Mr. Hunt's desk cooling. It cools according to the function $T = 70(0.80)^x + 20$, where x is the time in minutes and T is the temperature in degree Celsius.
- What is the initial temperature of the coffee?
- A) 20
 B) 70
 C) 75
 D) 90
- 9 Using your function in question 8, what is the temperature after 10 minutes?
- A) 7.5
 B) 20
 C) 27.5
 D) 76
- 10 Using your function in question 8, what will the coffee eventually cool to?
- A) 0
 B) 20
 C) 70
 D) 90
- 11 Michael invested \$5000 into an account that has a 5.5% annual interest rate. What equation best describes this investment after t years?
- A) $A = 5000(.055)^t$
 B) $A = 5000(1.055)^t$
 C) $A = 5000(1.55)^t$
 D) $A = 5000(.945)^t$
- 12 A photocopier is purchased for \$5200 and depreciates in value by 15% per year. Which equation best describes the value of the photocopier in t years?
- A) $y = 5200(0.15)^x$
 B) $y = 5200(0.85)^x$
 C) $y = 5200(1.15)^x$
 D) $y = 5200(1.85)^x$

Part II

The following formula will be needed to complete this section of the exam.

$$y = ab^x$$

$$y = ab^{x/c}$$

- 1 Each sequence below is geometric. Determine the missing terms by finding the common ratio and using it to find the missing terms of the sequence. {4}
- A) $\{8, 17.6, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \dots\}$
 CR = $\underline{\hspace{1cm}}$

B) { _____, _____, _____, 102.4, 256}

CR = _____

2 Using one of the formulas above, write an equation that will represent the exponential data given below. {12}

A) _____

0	1	2	3	4
15	60	240	960	3840

B) _____

0	3	6	9	12
0.5	4	32	256	2048

C) _____

-10	-6	-2	0	4
625	125	25	5	1

D) _____

10	0	20	5	15
54	6	486	18	162

- 3 For each function
- A) below fill in the table of values below

B) identify the exponential function as growth or decay curve

C) identify the common ratio

D) identify the y-intercept

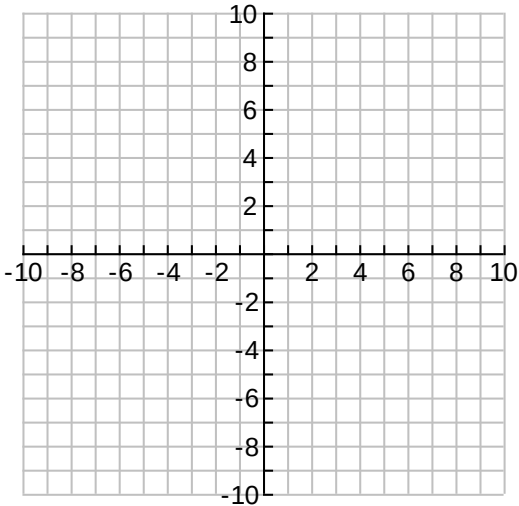
E) state the equation of the asymptote (show on graph as well)

F) state the domain and range

G) find y(-3)

i) $y = 2.5^x - 6$ {12}

x	y
-2	
-1	
0	
1	
2	
3	



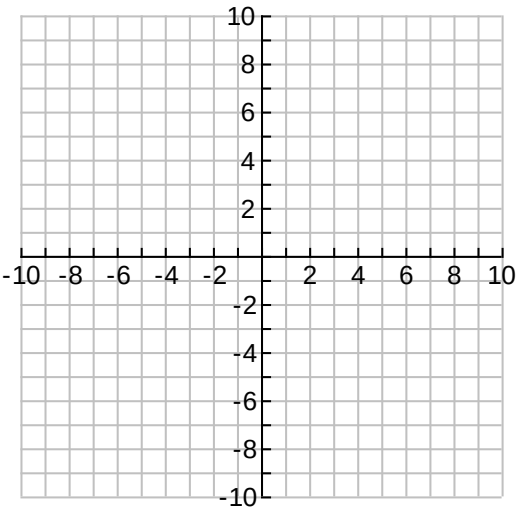
C)_____ D)_____ E)_____

F)_____

G) $y(-3) =$

i) $y = 3(0.60)^x$ {12}

x	y
-2	
-1	
0	
1	
2	
3	



- C)_____ D)_____ E)_____
- F)_____
- G) $y(-3) =$

4 State the equation of the horizontal asymptote, y intercept, whether the curve represents growth or decay, and the domain and range. {10}

- A) $y = 4(1.0026)^x$

- B) $y = 5^x - 8$

5 For each problem below, set up an exponential model and use it to solve the problem. {12}

- A) Suppose a \$125 000 piece of machinery is depreciating at 8.5% a year. How much will it be worth after 3 years?
- B) The population of a small town is decreasing at a rate of 7% per year. If the town’s population is 12 250 now, what will be the population in 10 years?

- C) The population of black flies in Labrador in the summer grows at a rate of 50% every two days. If there are 5000 flies on June 5, how many flies will there be on June 21?

6 Tommy bought a new sports car for \$45 000. It depreciates annually by 20% per year.

- A) Fill in the table below: {2}

year	0	1	2	3	4
value of car \$	45 000				

- B) What is the common ratio? {2}

- C) What is the exponential function that describes the above data? {2}

- D) Using c, find how much will the car be worth in 6 years (show workings). {2}

- E) Use your calculator to find when it will be worth \$10 001? {2}

7 A cup of coffee is left to cool inside a room and its’ cooling can be described by the function $y = 85(.75)^{x/5} + 15$ where **x** is time in minutes and **T** is the temperature of the coffee in degrees Celsius.

- A) Fill in the table below: {3}

x (time)	0	5	10	15	20
T (Temperature)					

- B) What is the initial temperature of the coffee? {2}

- C) Enter the function in your calculator and determine when the coffee will be at 50°C? 20°C? {4}

- D) What will the temperature of the coffee eventually cool to and why? {3}

E) Sketch a graph of the coffee cooling using your table above. Include the horizontal asymptote. {5}

