Math 30-2
Unit 6: Exponential Functions Assignment
Total: _____/29 marks

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. How many x-intercepts does the exponential function $f(x) = 2(10)^x$ have?

A. 0
B. 1
C. 2
D. 3

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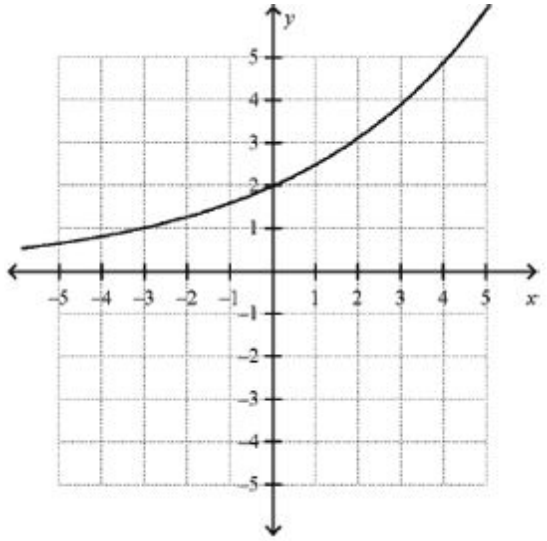
2. Match the following graph with its function.



A. $y = 3(0.5)^x$

B. $y = 2(1.25)^x$

C. $y = 0.5(3)^x$

D. $y = 2(0.75)^x$

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3. Determine the y-intercept of the exponential function $f(x)=2\left(\frac{1}{3}\right)^x$.

A. 0
B. 1
C. 2
D. 4

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4. Calculate $5^{3x-8}=25^{2x}$.

A. -8
B. 8
C. -4
D. 4

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5. Solve the following exponential equation $3^{4a}=\sqrt{243}$.

A. $a=\frac{3}{4}$
B. $a=\frac{5}{8}$
C. $a=\frac{9}{16}$

D. $a = \frac{7}{8}$

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6. The following data set involves exponential growth. Determine the missing value from the table.

x	0	1	2	3	4	5	6
y	0.16	0.40	1.00	2.50		15.63	39.06

A. 6.25 B. 5.00 C. 7.50 D. 8.75

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7. Determine the equation of the exponential function for the data.

x	0	1	2	3	4	5
y	3.5	5.6	9.0	14.2	23.1	36.7

A. $y = 3.5(1.6)^x$

B. $y = 2.2(1.6)^x$

C. $y = 3.5(1.8)^x$

D. $y = 3.5(0.8)^x$

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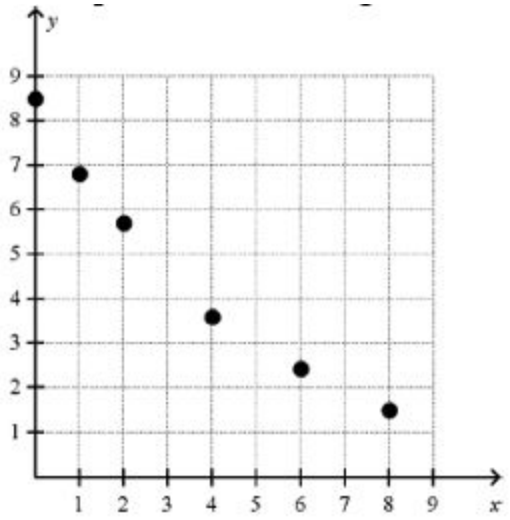
8. A scatter plot is drawn using a data set.
Determine the value of y when x = 10.



A. 1.5
B. –0.3
C. 0.0
D. 1.0

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9. An investment can be modelled by the following growth function, where x represents the time in years:

$$y = 2500(1.018)^x$$

What was the principal invested?

A. $1250
B. $2500
C. $18
D. $1018

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10. An investment can be modeled by the following growth function, where x represents the time in years:

$$y = 4800(1.03)^x$$

How long, in months, did it take for the account to exceed $5000?

A. 1
B. 9
C. 13
D. 17

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11. To the nearest whole number, solve the following investment equation for the number of compounding periods, n.

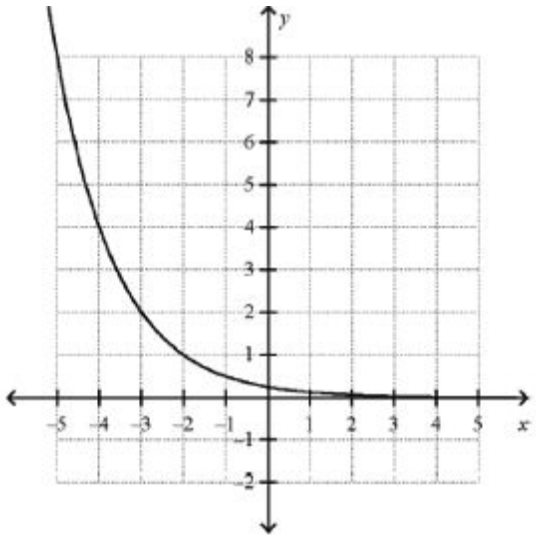
$$350 = 300(1.04)^n$$

A. 2
B. 4
C. 8
D. 16

Written Response

Please show/explain all of your work for full marks.

1. Use the graph of an exponential function shown below.



a. Estimate the x-value at $y = 4$. **(1 mark)**

b. Estimate a possible value of "*b*" if the general form of an exponential function is $a(b)^x$? **(1 mark)**

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2. Solve the following exponential equation algebraically. Verify your solution by graphing.
(2 marks)

$$1000 = 10^{2a-1}$$

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3. Determine whether the following data set involves exponential growth, exponential decay, or neither. Explain how you know. **(2 marks)**

x	1	2	3	4	5	6
y	5	15	45	135	405	1215

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4. The fish population in Loon Lake is modelled by the equation $P(t) = 2500(0.92)^t$,
where *P* represents the number of fish and *t* represents the time, in years, since 2010.

Estimate the fish population in 2030. **(1 mark)**

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5. A vehicle was purchased for $15 000 in 2005. The book value of the vehicle can be modelled by the exponential function

Year	2005	2006	2007	2008	2009	2010
Number of Years Since 2005, t	0	1	2	3	4	5
Value of Vehicle, V(t)	$15 000	$12 300	$10 086	$8270.52	$6781.83	$5561.10

where V represents the value in dollars and t represents the time, in years, after 2005.

a) Determine the exponential regression that represents the value of the vehicle of the past 5 years. Round your numbers to the nearest hundredth. **(1 mark)**

b) How does the value of the vehicle change over time? Explain how you know. **(2 marks)**

c) Estimate the value of the vehicle in 2015. Show your work. **(1 mark)**

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6. Solve the equation and verify your answer by substitution. Show your work. **(2 marks)**

$$6(8)^{5-x} = 3072$$

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7. Thorium-227 has a half-life of 18.4 days. The remaining amount of a 50-mg sample of thorium-227 can be modeled by the equation

$$A(t) = 50\left(\frac{1}{2}\right)^{\frac{t}{18.4}}$$

where A is the amount of thorium-227 remaining, in milligrams, and t is the time in days.

a) Determine when 12.5 mg of thorium-227 are remaining. Show your work. **(1 mark)**

b) Use a **graphing calculator** to determine when 5 mg of thorium-227 are remaining, to the nearest day. Show your work. **(1 mark)**

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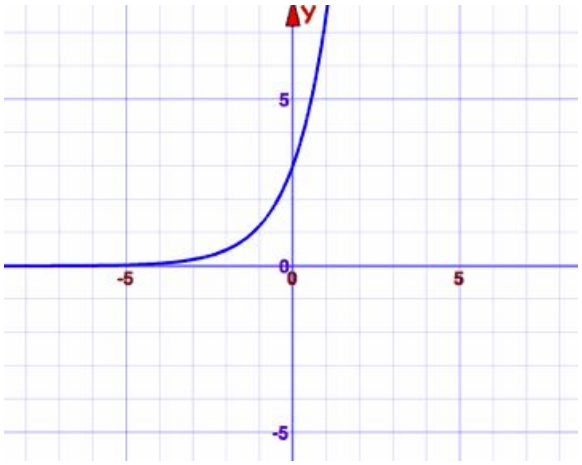
8. Chloe says that the equation $y = 3(2.5)^x$ represents the graph below.



a. Can she be possibly correct? Explain your answer. **(2 marks)**

b. What is the range of the graph? **(1 mark)**