MCF3M Chapter 7 Practice Test

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1. Classify each of these as linear, quadratic or neither.

a)

x	y
-4	972
-3	324
-2	108
-1	36
0	12

b)

x	y
2	17
3	14
4	11
5	8
6	5

c)

x	y
2	100
3	84
4	71
5	61
6	54

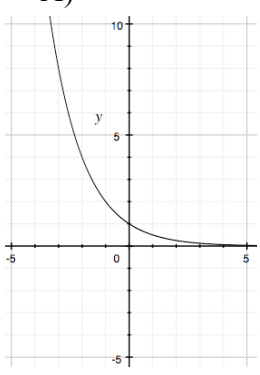
2. For each of the following, state the domain, range, equation of asymptote and the y-intercept.

	$y=-3(2)^x+7$	$f(x)=8(1.02)^x-14$	$g(t)=-0.1(0.3)^t-99$
Domain			
Range			
Asymptote			
y-intercept			

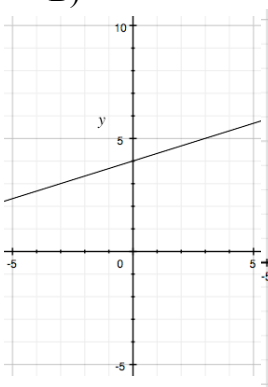
3. Write the letter for the graph that corresponds to each equation:

$y=2^x+3$
$y=2^x$
$y=\left(\frac{1}{2}\right)^x$
$y=x^2-3$
$y=\frac{1}{3}x+4$

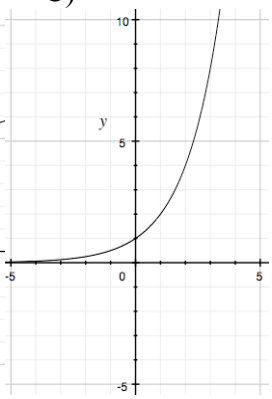
A)



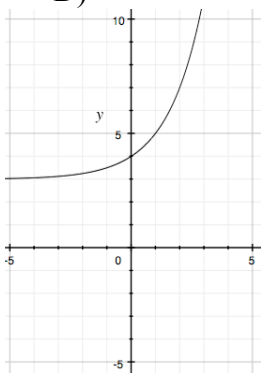
B)



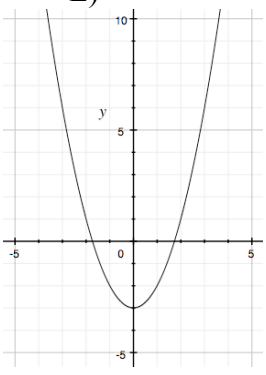
C)



D)



E)



4. A statue is bought for $700 today, and will increase in value by 9% each year.

a) Create an equation for this situation. Let V be value after n years.

b) How much will the statue be worth in 2040?

c) When will the status be worth one million dollars?

5. A small town in Ontario is dying ... young people are leaving for a nearby city. The population was 4000 in the year 2008 but has been declining by 12% every year since.

a) Create an equation for this situation. Let P be the population after n years.

b) What is the population right now?

c) How long is it taking the population of the town to *halve*?

1. Classify each of these as linear, quadratic or neither.

a)
Constant ratio.
972/324=3; 324/108=3; etc
Exponential

b)
Constant first differences.
-3 each time.
Linear

c)
Constant Second Differences
First Diffs: -16, -13, -10, -7
Second Diffs: 3, 3, 3, 3
Quadratic

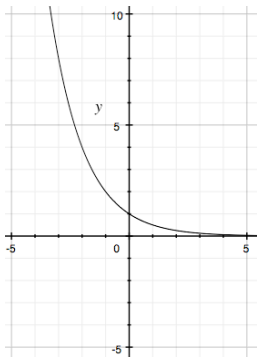
2. For each of the following, state the domain, range, equation of asymptote and the y-intercept.

	$y=-3(2)^x+7$	$f(x)=8(1.02)^x-14$	$g(t)=-0.1(0.3)^t-99$
Domain	$\{x\in\mathbb{R}\}$	$\{x\in\mathbb{R}\}$	$\{x\in\mathbb{R}\}$
Range	$\{y\in\mathbb{R}\mid y<7\}$	$\{y\in\mathbb{R}\mid y>-14\}$	$\{y\in\mathbb{R}\mid y<-99\}$
Asymptote	y=7	y=-14	y=-99
y-intercept	$y=-3(2)^0+7=-3+7=4$	$y=8(1.02)^0-14=8-14=-6$	$y=-0.1(0.3)^0-99=-0.1-99=-99.1$

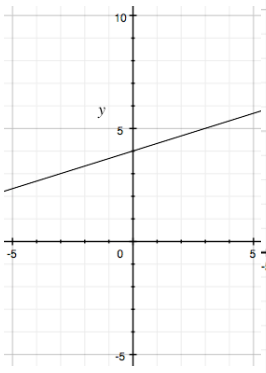
3. Write the letter for the graph that corresponds to each equation:

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

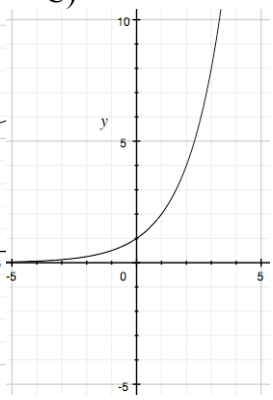
A)



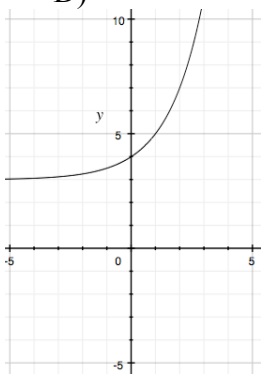
B)



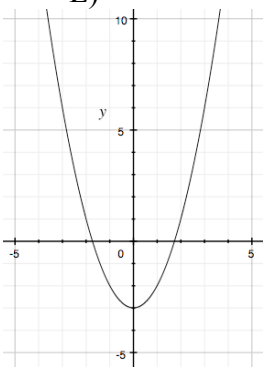
C)



D)



E)



4. A statue is bought for $700 today, and will increase in value by 9% each year.

a) Create an equation for this situation. Let V be value after n years.

$$V(n)=700(1.09)^n$$

b) How much will the statue be worth in 2040?

2040 is 22 years away, since 2040-2018=22

$$V(22)=700(1.09)^{22}=700(6.6586)=\$4661.02$$

c) When will the status be worth one million dollars?

$$1{,}000{,}000=700(1.09)^n$$

$$\frac{1{,}000{,}000}{700}=1.09^n$$

$$1{,}428.57=1.09^n$$

$$n=\frac{\log 1428.57}{\log 1.09}=84.3$$

So it will be worth one million in 84 years (the year 2102)

5. A small town in Ontario is dying ... young people are leaving for a nearby city. The population was 4000 in the year 2008 but has been declining by 12% every year since.

a) Create an equation for this situation. Let P be the population after n years.

$$P(n)=4000(1-0.12)^n=4000(0.88)^n$$

b) What is the population right now?

$$P(10)=4000(0.88)^{10}=4000(0.2785)=1114$$

c) How long is it taking the population of the town to *halve*?

$$2000=4000(0.88)^n$$

$$0.5=0.88^n$$

$$n=\frac{\log(0.5)}{\log(0.88)}=5.42$$

It takes 5.42 years (5 years and 5 months) to halve the population.