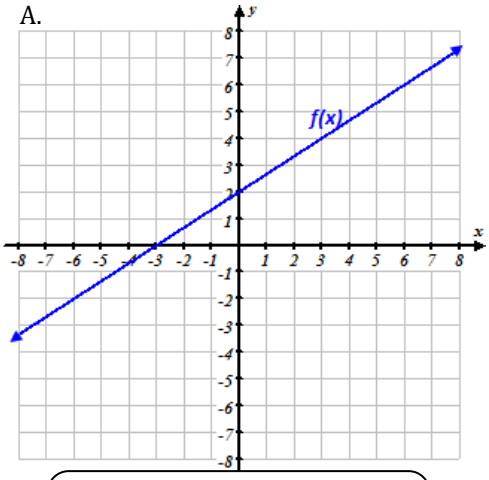
Sec 2.9 – Functions
Building Linear & Exponential Functions

Name: _____

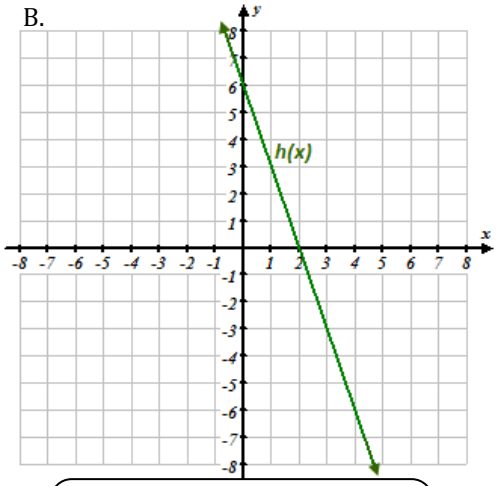
1. Write an equation to describe each **linear function** graphed below.

A.



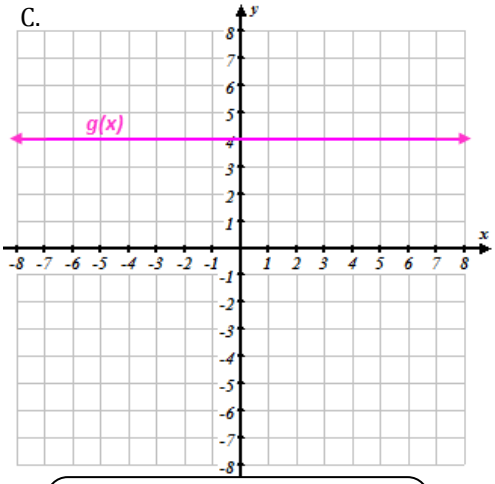
f(x) =

B.



h(x) =

C.



g(x) =

2. Write an equation to describe each **linear function** graphed below.

A. The linear function, *f(x)*, has a slope of ½ and a y-intercept of 4.

f(x) =

B. The linear function, *g(x)*, passes through the point (3,1) and has a slope of ⅔.

g(x) =

C. The linear function, *h(x)*, passes through the points (2, 4) and (6, 2).

h(x) =

D. The linear function, *p(x)*, is parallel to the function $t(x) = \frac{1}{4}x + 2$ and passes through the point (8, 1).

p(x) =

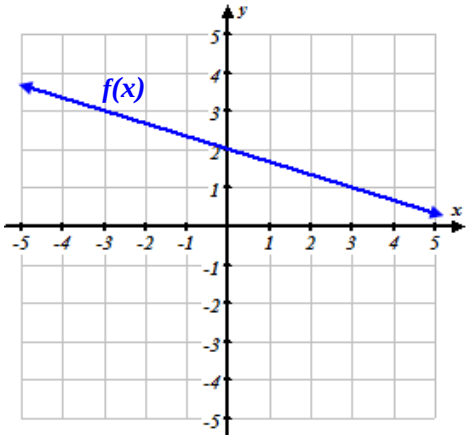
3. Write an equation to describe each **linear function** graphed below.

A. Determine an equation that describes *d(x)* based on the partial set of values in the table below.

x	–2	0	2	4	6
d(x)	1	2	3	4	5

d(x) =

B. Determine an equation that describes *m(x)*, given that *m(x)*, is parallel to *f(x)* *(shown in the graph at the right)* and it passes through the point (3, –2).



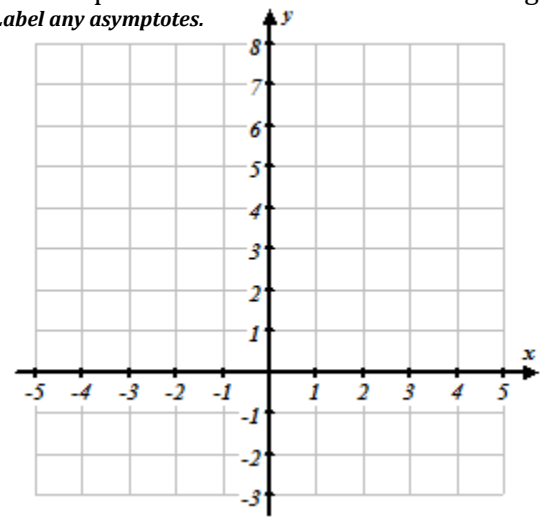
m(x) =

4. Consider the **exponential function** , $f(x) = 2^x$.

A. Fill in the missing values in the table below.

x	***f(x)***
3	
0	
	4
1	
–1	
–3	

B. Plot the points from the table and sketch a graph
Label any asymptotes.

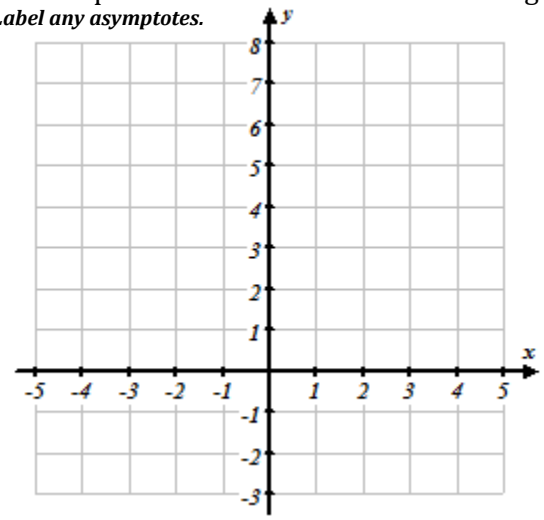


5. Consider the **exponential function** , $g(x) = 3^x - 2$.

A. Fill in the missing values in the table below.

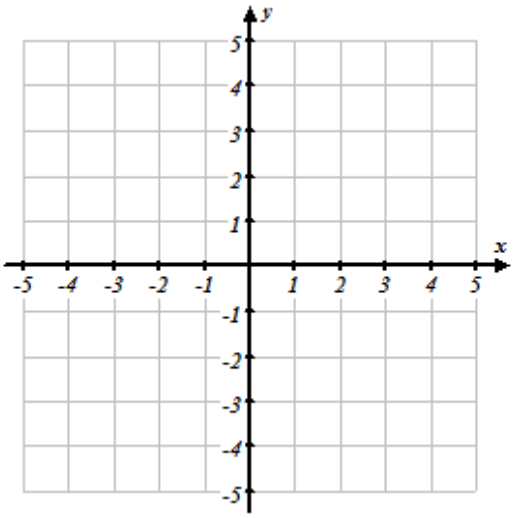
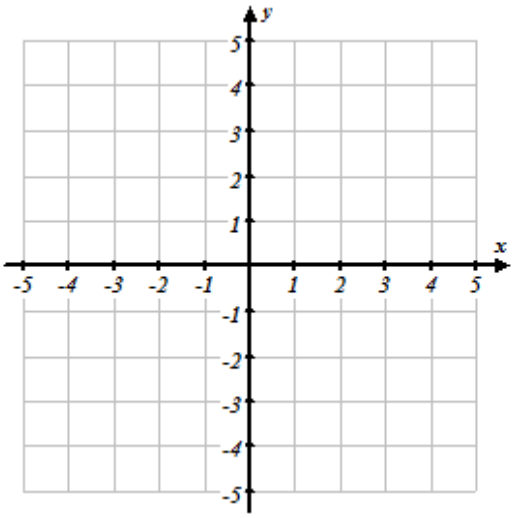
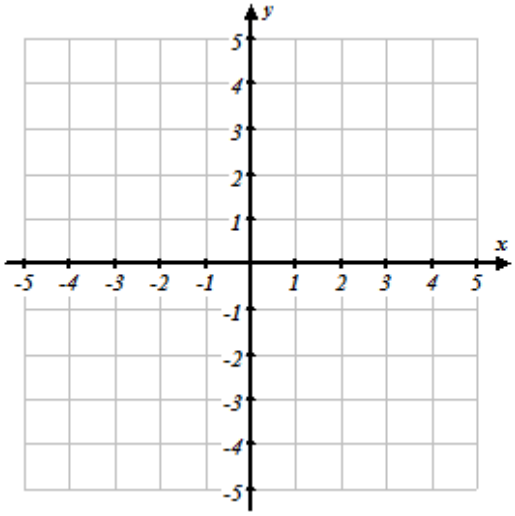
x	***g(x)***
2	
3	
	1
0	
–1	
–3	

B. Plot the points from the table and sketch a graph
Label any asymptotes.



6. For each of the functions, determine the asymptote and sketch a graph (label the points when x = 0 and when x = 1.)

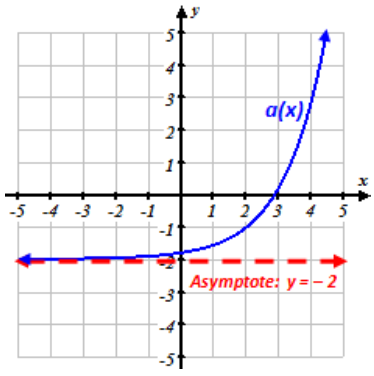
A. $f(x) = 4^x - 4$ B. $g(x) = \left(\frac{1}{2}\right)^x + 1$ C. $h(x) = 2 \cdot 3^x - 3$

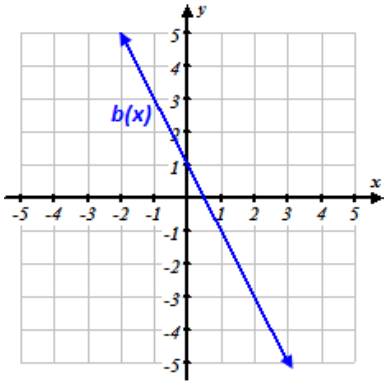




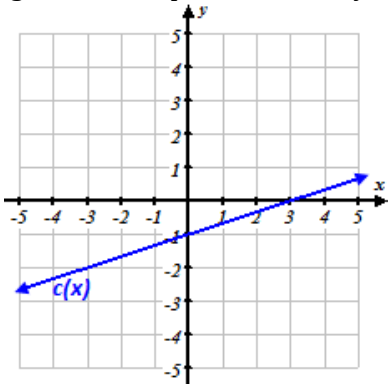
7. Create two different exponential functions of the form $f(x) = a \cdot b^x + c$ that have a horizontal asymptote at $y = 2$.

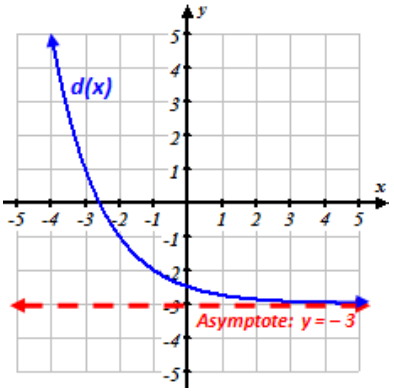
8. Given the function $f(x)$ is of the form $f(x) = a \cdot b^x + c$, has a horizontal asymptote at $y = 2$, and passes through the point (0,5), create a possible function for $f(x)$.

9. Tell which functions below could represent exponential growth or exponential decay.









x	0	1	2	3	5
f(x)	3	5	7	9	13

x	1	2	3	4	5
g(x)	65	33	17	9	5

x	1	2	3	4	5
h(x)	3	7	19	55	163

$j(x) = 4x + 2$ $k(x) = 192 \cdot (0.5)^x + 8$ $m(x) = 3 \cdot (1.5)^x + 2$ $n(x) = -\frac{1}{2}x + 6$

10. In a science experiment, a student is measuring the height of a plant each week. The student began the project on week 0 with the plant already 4 inches tall. The student determined that the plant would increase in height by 20% each week (for the first 10 weeks). Create an exponential function of the form $f(t) = a \cdot b^t$ that describes the height of the plant as a function of t, where t is the number of weeks after the project began.