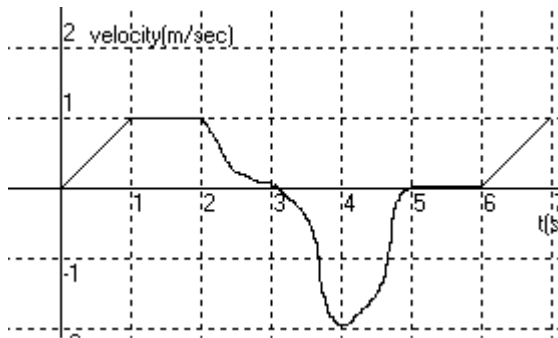


The final exam is 20% of the final grade so that you must be well prepared for the final. Otherwise, your final grade will be lowered significantly. You should go over your past tests carefully again for the final exam with this review.

1. Answer the following based on the graph of the following velocity function of a particle moving on a coordinate line. The particle starts at the origin at the beginning. We assume that the positive velocity means for a particle moving to the right.



- (a) When does the particle move to the right?
- (b) When does the particle stand still for more than an instant?
- (c) When does the particle reverse direction?

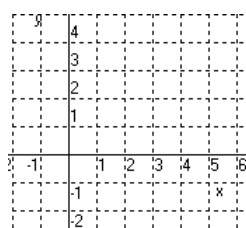
2. The temperature $F=F(C)$ in Fahrenheit is a linear function of the temperature C in Celsius.

A lab assistant placed a Fahrenheit thermometer besides a Celsius thermometer and observed the following: When the Celsius thermometer reads 30 degrees the Fahrenheit thermometer reads 86 degrees. When the Celsius thermometer reads 40 degrees, the Fahrenheit thermometer reads 104 degrees.

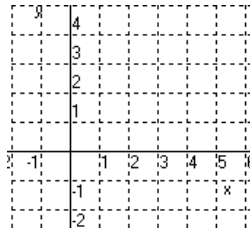
- (a) Express F as linear function of C .
- (b) At sea level, water boils at 212 degrees Fahrenheit. What temperature in degrees Celsius makes water boil?

3. Sketch the graph of the following.

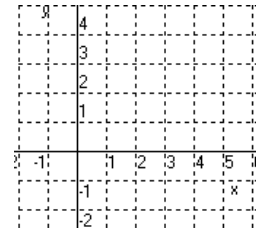
(a) $2x - y = 2$



(b) $y = -2x + 4$

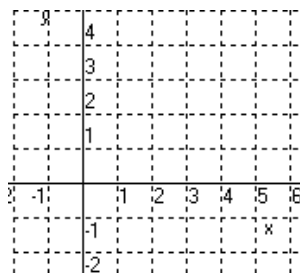


(c) $y = \log x$

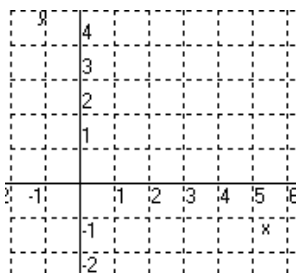


(d) $y = -(x-1)^2 + 1$

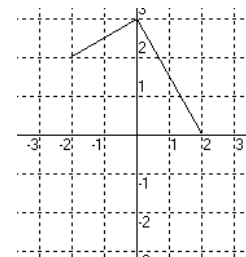
below.



(e) $y = -x^2 + 2x - 1$

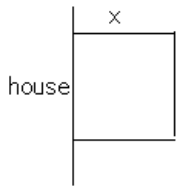


(f) $y = -f(x+1)$ if the graph of $y=f(x)$ is given



4. If the Democratic Republic of Congo has a population about 40 million people and a doubling time of 22 years, find the population in (a) 5 years (b) 30 years (c) How long does it take for the population to be 100 million?

5. A homeowner has 80 feet of chain-link fencing to be used to construct a dog pen adjacent to a house.



- (a) Express the area $A(x)$ enclosed by the pen as a function of the width x .
 (b) Graph $A(x)$ and determine the width x that will make the area maximum.

6. Fill in the following blank based upon the information provided and find the formula for each.

(a) linear function with slope -2

x	y
-2	
0	8
1	
2	
4	

Formula:

(b) exponential function with base $\frac{1}{2}$

x	y
-2	
0	8
1	
2	
4	

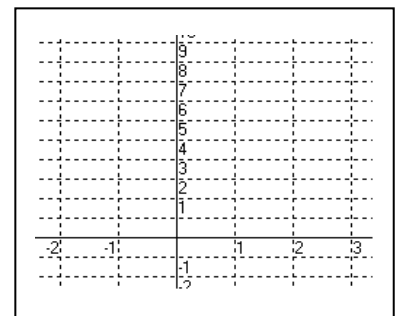
Formula:

7. Answer the following.

(a) Sketch the graph of the function $y = f(x) = 3 \cdot 2^x$ to the right.

(b) Is it 1-1? (Circle one) Yes, No Why?

What is the value of $f^{-1}(6)$?



8. The following table is for an exponential function.

(a) Fill in the blank below.

x	y = f(x)
0	2
2	6
4	
10	

(b) Find the formula of this function.

(c) Find x values such that $f(x) = 54$.

9. Solve the following equations.

(a) $0 = (x-1)(3x+2)$ (b) $0 = -(x+1)^2 + 1$ (c) $-1 = x^2 - 3x$

(d) $2 \cdot e^x = 34$ (e) $\log_2 x = 4$ (f) $\log_3(x-8) = 2 - \log_3 x$

10. A person on an assembly line produces P items per day after t days of training, where $P = 400(1 - e^{-t})$.

How many days of training will it take this person to be able to produce 300 items per day?

11. Solve the system:
$$\begin{cases} 2x + y = 1 \\ -3x + 2y = -5 \end{cases}$$

12. A supermarket mixes beans that sells for \$3.60 per pound with bean that sells for \$7.20 per pound to obtain 24 pounds of bean selling for \$6.00 per pound. How much of each type of bean should be used?