

Calculus AB  
Summer  
Assignment  
2010

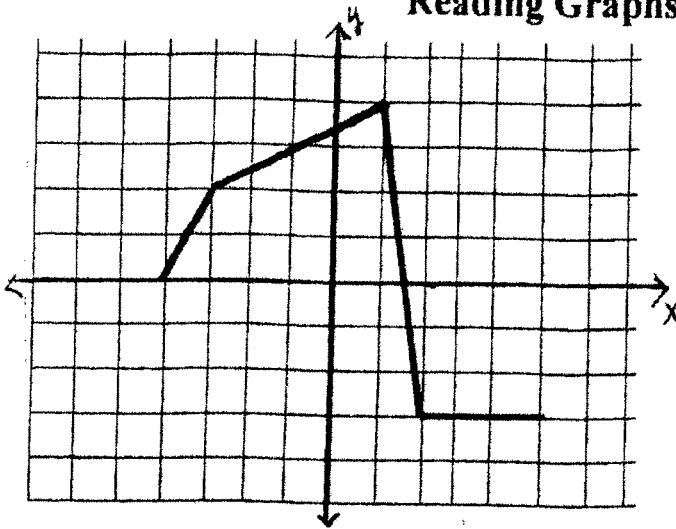
**(Due on the first day of school 8/12/10)**

This will be your first **graded** assignment!!!!

# A. Interpreting Graphs

## Reading Graphs

1.



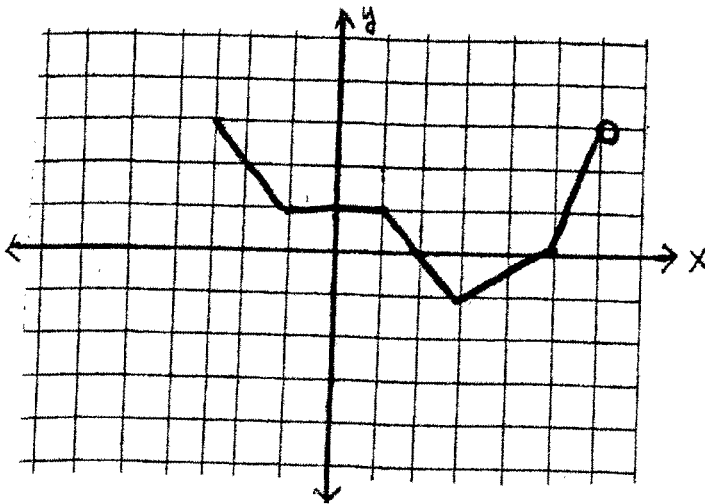
a) domain: \_\_\_\_\_ b) range: \_\_\_\_\_ c) increasing: \_\_\_\_\_

d) decreasing: \_\_\_\_\_ e) constant: \_\_\_\_\_

f) max: \_\_\_\_\_ g) min: \_\_\_\_\_ h)  $f(2) =$  \_\_\_\_\_

i)  $f(-3) =$  \_\_\_\_\_ j)  $f(x) = 4$  \_\_\_\_\_ k)  $f(x) > 0$  \_\_\_\_\_

2.



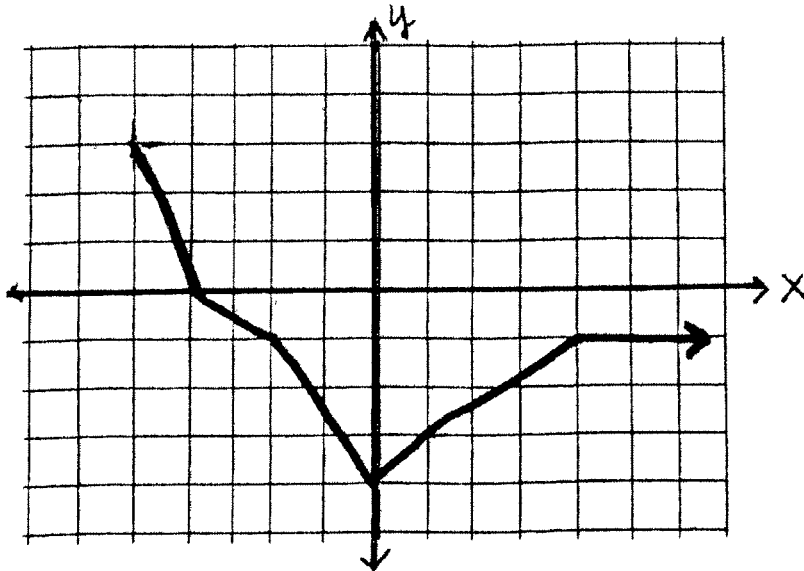
a) domain: \_\_\_\_\_ b) range: \_\_\_\_\_ c) increasing: \_\_\_\_\_

d) decreasing: \_\_\_\_\_ e) constant: \_\_\_\_\_

f) max: \_\_\_\_\_ g) min: \_\_\_\_\_ h)  $f(-1) =$  \_\_\_\_\_

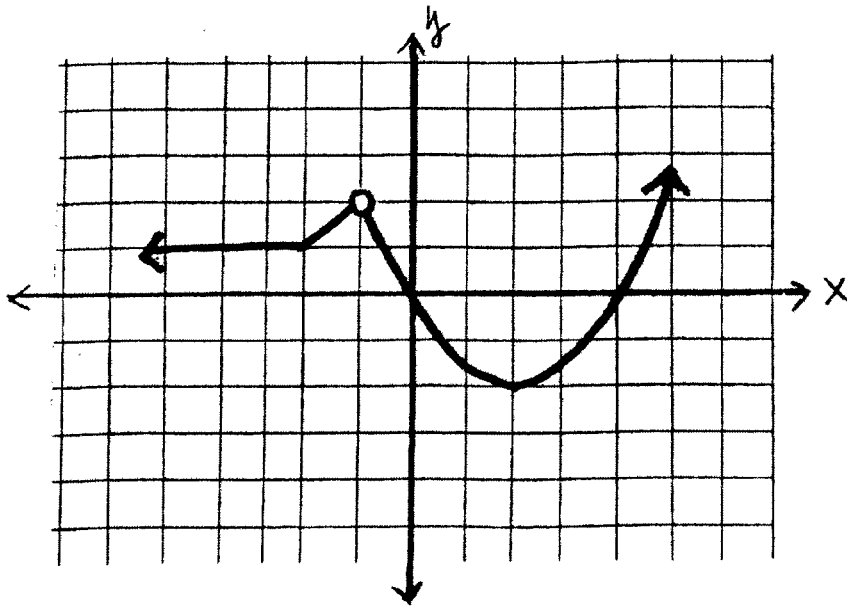
i)  $f(5) =$  \_\_\_\_\_ j)  $f(x) = 3$  \_\_\_\_\_ k)  $f(x) > 0$  \_\_\_\_\_

3.



- a) domain: \_\_\_\_\_ b) range: \_\_\_\_\_ c) increasing: \_\_\_\_\_  
 d) decreasing: \_\_\_\_\_ e) constant: \_\_\_\_\_  
 f) max: \_\_\_\_\_ g) min: \_\_\_\_\_ h)  $f(0) =$  \_\_\_\_\_  
 i)  $f(1) =$  \_\_\_\_\_ j)  $f(x) = -1$  \_\_\_\_\_ k)  $f(x) < 0$  \_\_\_\_\_

4.

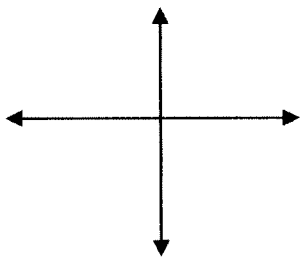


- a) domain: \_\_\_\_\_ b) range: \_\_\_\_\_ c) increasing: \_\_\_\_\_  
 d) decreasing: \_\_\_\_\_ e) constant: \_\_\_\_\_  
 f) max: \_\_\_\_\_ g) min: \_\_\_\_\_ h)  $f(4) =$  \_\_\_\_\_  
 i)  $f(-5) =$  \_\_\_\_\_ j)  $f(x) = -2$  \_\_\_\_\_ k)  $f(x) < 0$  \_\_\_\_\_

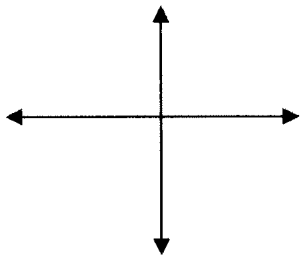
## Family of Functions

Graph each function and clearly indicate units on the axes provided.

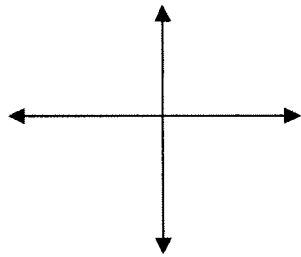
1.  $f(x) = x$



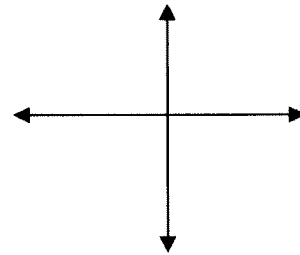
2.  $f(x) = x^2$



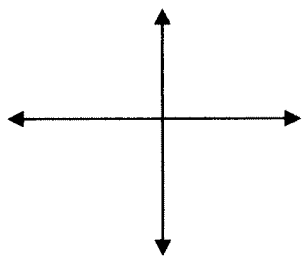
3.  $f(x) = x^3$



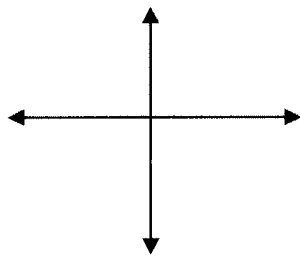
4.  $f(x) = |x|$



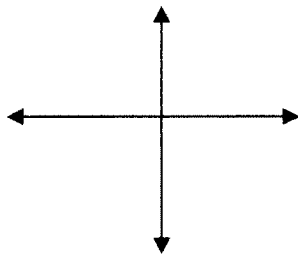
5.  $f(x) = \sqrt[3]{x}$



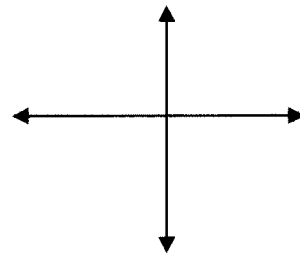
6.  $f(x) = e^x$



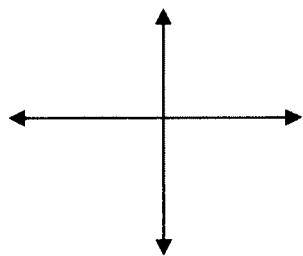
7.  $f(x) = \ln x$



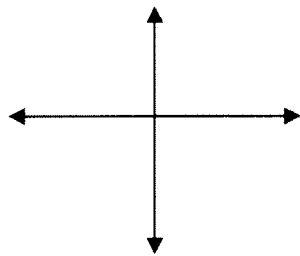
8.  $f(x) = \frac{1}{x}$



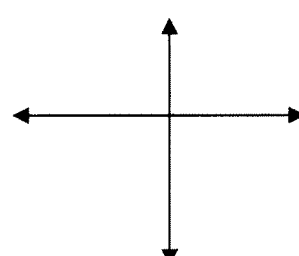
9.  $f(x) = \frac{1}{x^2}$



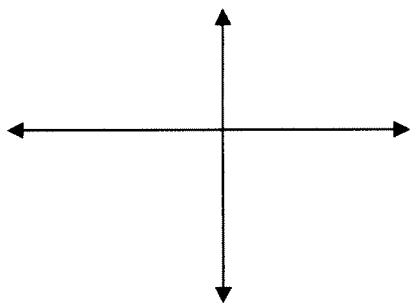
10.  $f(x) = \sqrt{x}$



11.  $f(x) = \sqrt{a^2 - x^2}$   
where  $a$  is a constant



12.  $f(x) = [x]$   
Greatest integer step function



### C. Transformations

Generalize what is happening graphically (describe the shift or reflection) when using  $f$  to graph each of the following:

1.  $f(-x)$  \_\_\_\_\_

2.  $-f(x)$  \_\_\_\_\_

3.  $f(x) + c$  \_\_\_\_\_

4.  $f(x - c)$  \_\_\_\_\_

### D. Horizontal and Vertical Asymptotes

Find the horizontal and vertical asymptotes for each of the rational functions.

1.  $f(x) = \frac{5x}{2x + 1}$

2.  $f(x) = \frac{x^2 - 3x - 4}{x^2 - 16}$

3.  $f(x) = \frac{x}{x^2 - 1}$

### E. Inequalities

Solve and graph each.

1.  $\frac{x - 2}{x + 1} < 0$

2.  $\frac{x^2 - x - 6}{x^2 - 9} \geq 0$

3.  $x^2 + 3x - 28 \leq 0$

4.  $3x^3 - 12x > 0$

## F. Trig Values and Graphs

1. What is the sign (positive or negative) on each trig value in the given quadrant?

Quadrant	Sine	Cosine	Tangent	Cosecant	Secant	Cotangent
I						
II						
III						
IV						

2. List the 3 reciprocal identities

3. List the 2 Quotient Identities

4. List the 3 Pythagorean Identities

Find the exact values of the following from the Unit Circle

5.  $\sin 0$

6.  $\cos \frac{5\pi}{4}$

7.  $\tan \frac{11\pi}{6}$

8.  $\csc \frac{5\pi}{3}$

9.  $\sec \pi$

10.  $\cot \frac{\pi}{2}$

11.  $\sin \frac{4\pi}{3}$

Find all angles, when  $0 \leq x < 2\pi$ , for which the following are true.

12.  $\sin x = \frac{\sqrt{3}}{2}$

13.  $\cos x = -1/2$

14.  $\tan x = 1$

15.  $\cot x = \frac{\sqrt{3}}{3}$

16.  $\sec x = 2$

17.  $\csc x = \frac{-2\sqrt{3}}{3}$

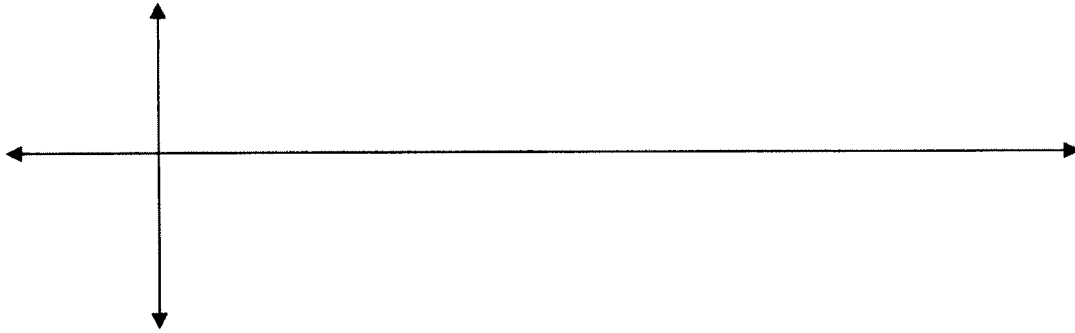
18.  $\arcsin \frac{1}{2}$

19.  $\cos^{-1} -\frac{\sqrt{2}}{2}$

20.  $\tan^{-1} \sqrt{3}$

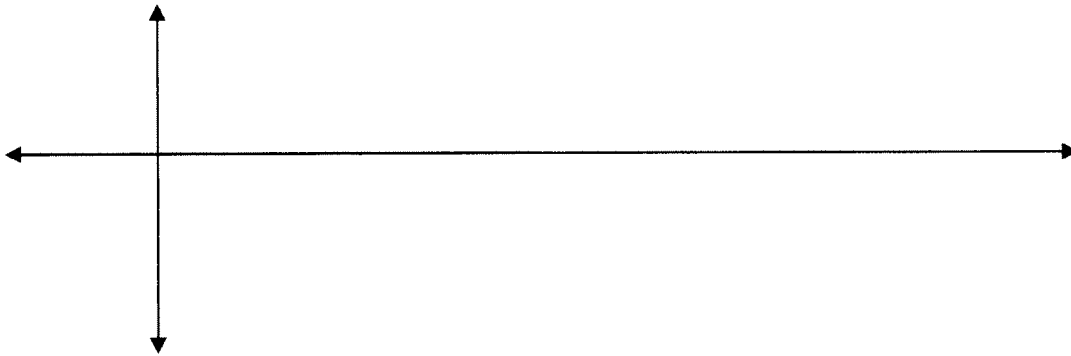
Sketch each graph from  $[0, 2\pi]$  and give the domain, range, amplitude and period.

21.  $y = \sin x$



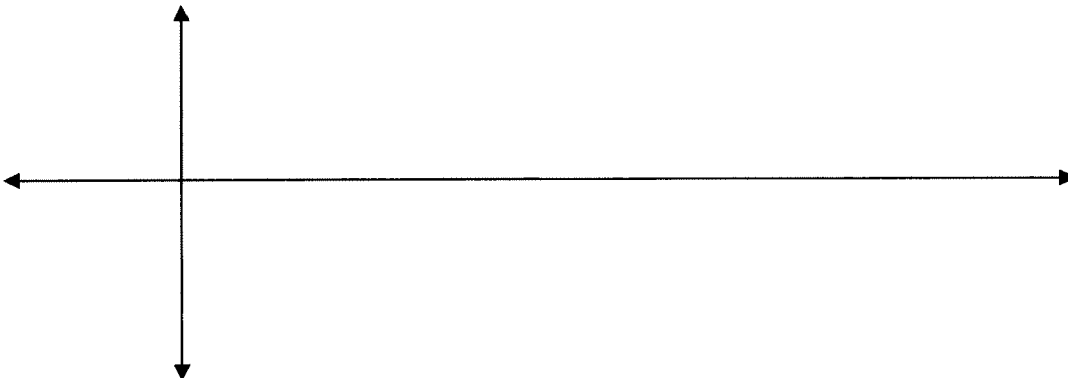
Domain: \_\_\_\_\_ Range: \_\_\_\_\_ Amplitude = \_\_\_\_\_ Period = \_\_\_\_\_

22.  $y = \cos x$



Domain: \_\_\_\_\_ Range: \_\_\_\_\_ Amplitude = \_\_\_\_\_ Period = \_\_\_\_\_

23.  $y = \tan x$



Domain: \_\_\_\_\_ Range: \_\_\_\_\_ Period = \_\_\_\_\_

## G. Logarithms and Exponentials

Rewrite as a sum or difference of logs ( expand ).

1.  $\ln(10z)$

2.  $\log(y/2)$

4.  $\ln \sqrt[3]{t}$

Solve .

5.  $e^{4x} = 125$

6.  $36^{2x} = 6$

7.  $\log_9 x = \frac{3}{2}$

8.  $\log_x 16 = -2$

## H. Limits

Find the following limits, if they exist.

1.  $\lim_{x \rightarrow \pi} \frac{3\sin x - 1}{2\cos x + 1}$

2.  $\lim_{x \rightarrow 3} \frac{9 - x^2}{x^2 + 3x - 18}$

3.  $\lim_{x \rightarrow 25} \frac{\sqrt{x} - 5}{x - 25}$

4.  $\lim_{x \rightarrow -2} \frac{x^2 + 2x - 3}{x^2 + 7x + 12}$

5.  $\lim_{x \rightarrow \infty} \frac{5 - x - 3x^2}{x^2 + 7}$

6.  $\lim_{x \rightarrow \infty} \frac{6x + 1}{x^3 - x^2}$

Use the graph of  $f(x)$  to find the following limits.

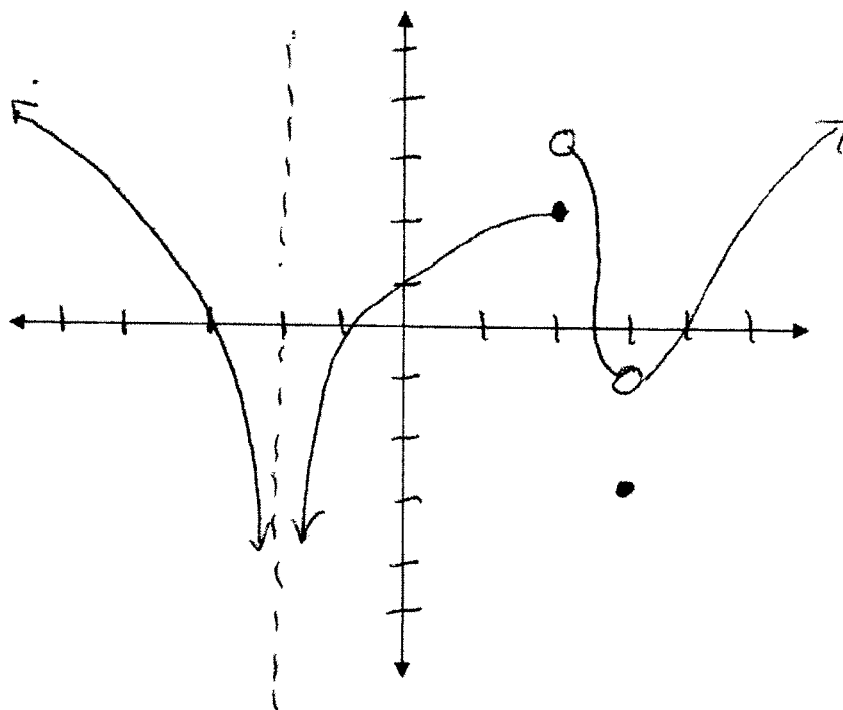
7.  $\lim_{x \rightarrow 0} f(x) =$

8.  $\lim_{x \rightarrow 2^-} f(x) =$

9.  $\lim_{x \rightarrow 3} f(x) =$

10.  $\lim_{x \rightarrow -2} f(x) =$

11.  $\lim_{x \rightarrow \infty} f(x) =$



### I. Continuity

Find any discontinuities and label as removable, non-removable or jump discontinuity

1.  $f(x) = \frac{x^2 - 1}{x^2 - 5x - 6}$

2.  $f(x) = \frac{x^2 + 10x + 9}{x^2 - 81}$

3.  $f(x) = \begin{cases} x^2 - 5x, & x < -2 \\ x - 6, & -2 \leq x \leq 3 \\ x^3 - 10x, & x > 3 \end{cases}$