

Your graphing calculator is an important resource that we will use throughout Calculus. Many problems in Calculus, however, require automatic recall and use of basic algebra skills. No problems on this assignment require the use of a calculator and a calculator should not be used to complete them. You may check your work using your calculator.

Please complete all problems in the packet and show all work. Bring your finished packet to class on the first day of school. We will review the packet during the first week of school.

### Linear Equations and Intercepts

1. Write the point-slope equation of the line through  $(-2, -1)$  and  $(1, -2)$
2. Write the equation of a horizontal line and a vertical line that pass through the point  $(0, -4)$
3. A table of values is given for a linear function  $f(x) = mx + b$ . Write the equation.
4. Write the equation of a line through  $(-2, 2)$  that is perpendicular to  $2x - y = 4$ .

x	y
1	2
3	9
5	16
9	30

5. Find the value of  $y$  for which that line through  $(-2, 3)$  and  $(4, y)$  has a slope of  $-\frac{2}{3}$ .

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### Solving Equations by Factoring

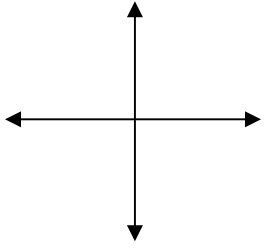
Solve:

6.  $x^2 + 3x - 4 = 6$

7.  $12x^2 = 3x$

## Basic Function Shapes

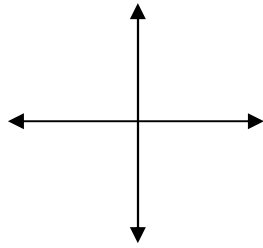
Sketch the function listed on the axis provided. Label any key points (such as x or y intercepts, vertex, etc). State the domain and range of each function. You must memorize these graphs.



$$y = 2$$

domain:

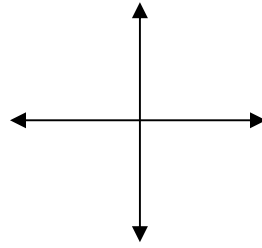
range:



$$y = x$$

domain:

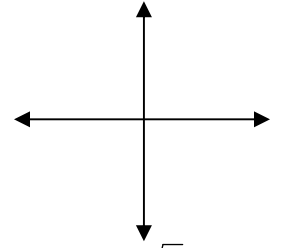
range:



$$y = x^2$$

domain:

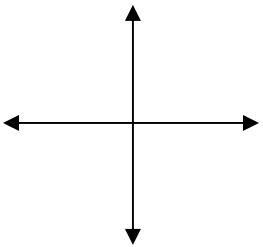
range:



$$y = \sqrt{x}$$

domain:

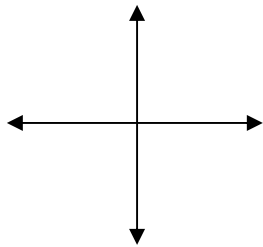
range:



$$y = x^3$$

domain:

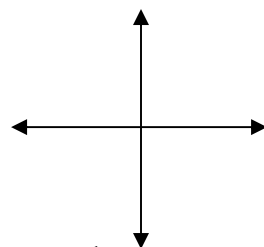
range:



$$y = \sqrt[3]{x}$$

domain:

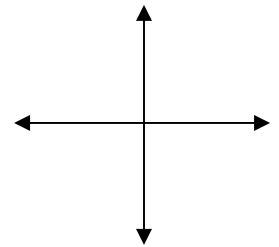
range:



$$y = \frac{1}{x}$$

domain:

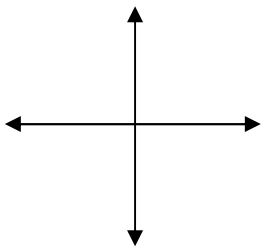
range:



$$y = |x|$$

domain:

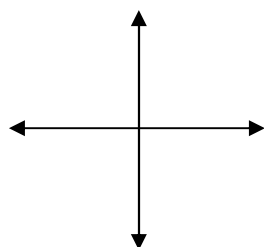
range:



$$y = e^x$$

domain:

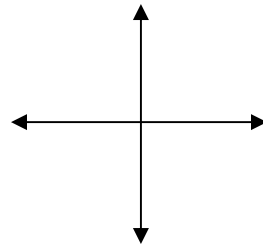
range:



$$y = \ln x$$

domain:

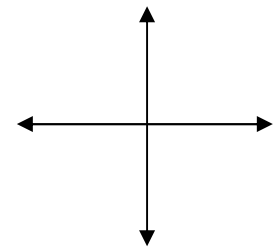
range:



$$y = \sin x$$

domain:

range:



$$y = \cos x$$

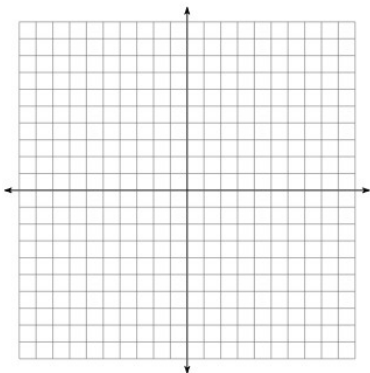
domain:

range:

## Transforming Functions

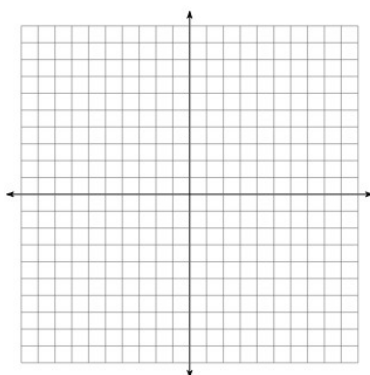
Write the effect of each constant on the basic shape. Sketch a graph of each function.

8.  $y = x^2 + 5$



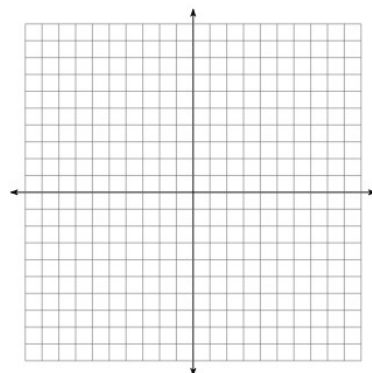
Transformation(s):

9.  $y = \sqrt{x+5}$



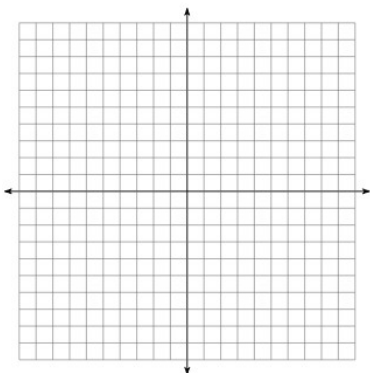
Transformation(s):

10.  $y = \frac{2}{x}$



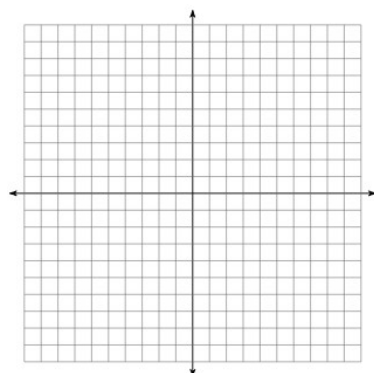
Transformation(s):

11.  $y = \ln(2x)$



Transformation(s):

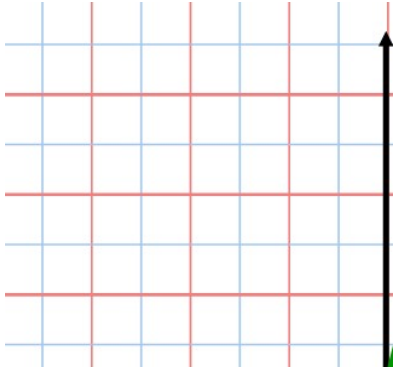
12.  $y = -|x|$



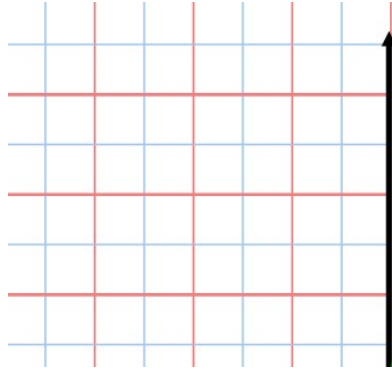
Transformation(s):

Each graph shows an original  $f(x)$ . Sketch the transformed function on the same axes.

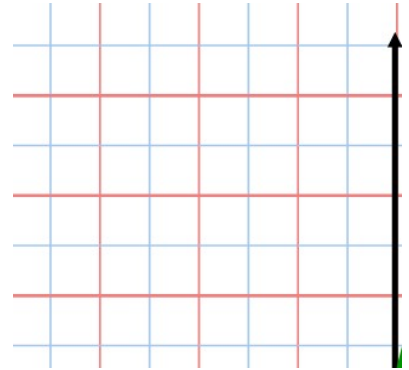
13.  $3f(x)$



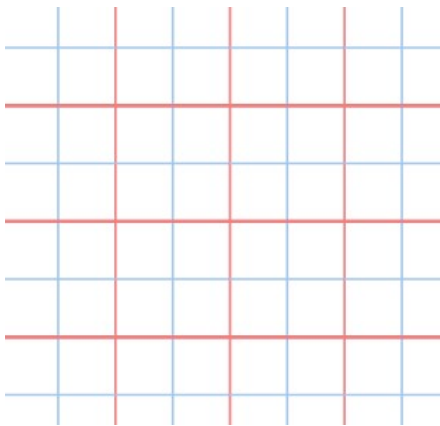
14.  $f(-x)$



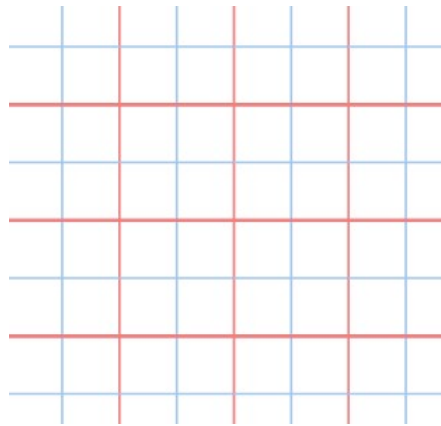
15.  $f(x-3)$



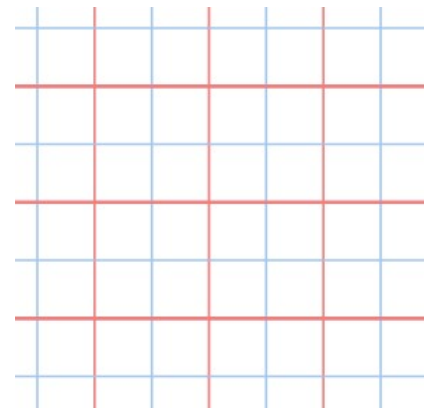
16.  $f(x) - 3$



17.  $f\left(\frac{1}{2}x\right)$



18.  $|f(x)|$



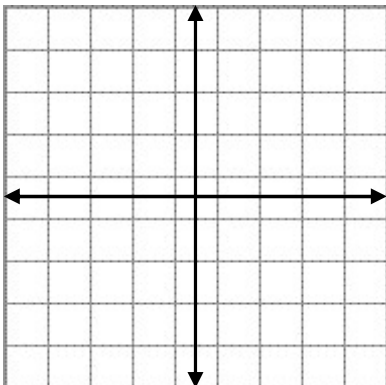
**Piecewise Functions**

19.  $f(x) = \begin{cases} x+3 & x > 0 \\ 5x & x < -5 \end{cases}$

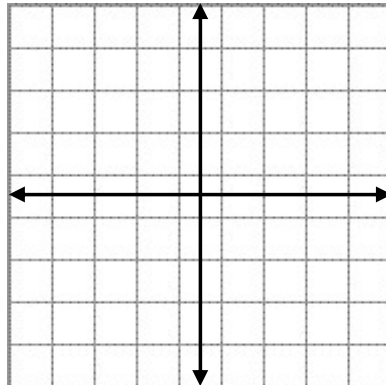
Find each of the following:  $f(7) = \underline{\hspace{2cm}}$   $f(-10) = \underline{\hspace{2cm}}$   $f(-1) = \underline{\hspace{2cm}}$

In #20 and #21, sketch each graph.

20.  $k(x) = \begin{cases} x^2 & x \leq 0 \\ -x & x > 0 \end{cases}$

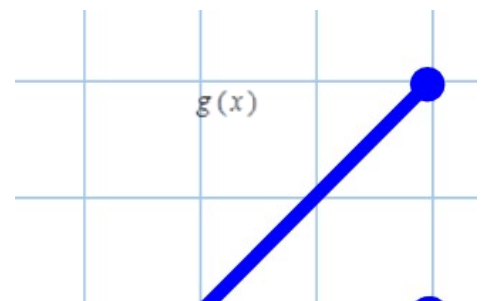


21.  $h(x) = \begin{cases} 3 & x > 2 \\ -2 & x < 0 \end{cases}$



In #22, write the equation of  $g(x)$

22.  $g(x) =$



## Inverse Functions

23. Explain the relationship between a function and its inverse function both graphically and algebraically.

24. Find the inverse of the following equation:  $f(x) = \frac{x+7}{x-1}$

25. Find the inverse of the following equation:  $g(x) = e^{2x} + 1$

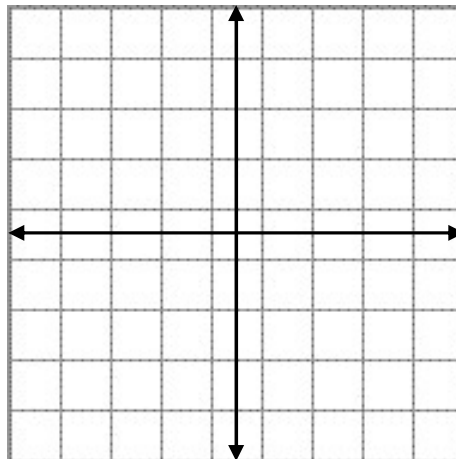
## Logarithms and Natural Logarithms

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

27. Sketch  $f(x)$ .

28. Sketch  $f^{-1}(x)$ .

29. Write the equation of  $f^{-1}(x)$ .



30. Rewrite using exponential form:  $\log_{16} 4 = \frac{1}{2}$  is equivalent to the equation: \_\_\_\_\_

31. Without using a calculator, find the exact value of the following logarithms:

a)  $\log_2 16$

b)  $\log_2 \left( \frac{1}{32} \right)$

c)  $\ln 1$

d)  $\ln e$

e)  $\ln \sqrt{e}$

Solve for x without using a calculator.

32.  $\log(1+x) = 3$

33.  $\ln x^2 = 4$

34.  $\ln(1/x) = -2$

### Trigonometry

Change these angles in degrees to radians.

35.  $45^\circ$

36.  $210^\circ$

37.  $-270^\circ$

Change these angles in radians to degrees.

38.  $\frac{\pi}{3}$

39.  $\pi$

40.  $\frac{7\pi}{4}$

Find the 6 trig ratios for each. Do not use a calculator.

41.  $60^\circ$

42.  $-\frac{\pi}{2}$

43.  $\pi$

44.  $210^\circ$

Give the exact value in degrees and radians. Each expression has only one answer. Do not use a calculator.

45.  $\sin^{-1} 0.5$

46.  $\tan^{-1} 0$

47.  $\cos^{-1} \left( -\frac{\sqrt{2}}{2} \right)$

Solve. Be sure to include all possible solutions for  $x$ :

48.  $\cos x = \frac{\sqrt{3}}{2}$

49.  $\sin x = -\frac{\sqrt{2}}{2}$

50.  $\tan x = 1$

51.  $\sin x = 1$

52.  $\sec x = -1$

53. Which of the following is the range of  $y = 5 \cos(x + \pi) + 3$ ?

A)  $(-\infty, \infty)$

B)  $[2, 4]$

C)  $[-8, 2]$

D)  $[-2, 8]$

E)  $\left[-\frac{2}{5}, \frac{8}{5}\right]$

54. Describe the end behavior of: a)  $f(x) = 3x^8 + 5x - 106$

b)  $f(x) = -6x^5 + 3x + 8$

55. Let  $f(x) = x^2 + 5$  and  $g(x) = 7x$ . Evaluate and simplify each of the following:

a)  $f(5)$

b)  $f(a + 2)$

c)  $\frac{f(x + h) - f(x)}{h}$

d)  $g(3)$

e)  $g(1 - a)$

f)  $\frac{g(x + h) - g(x)}{h}$