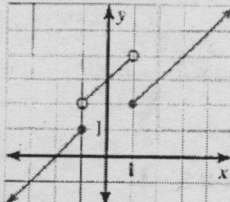
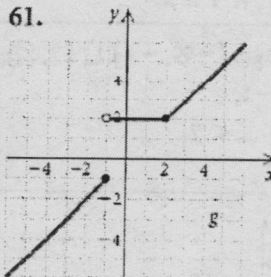
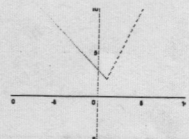
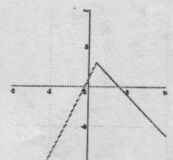


### Learning Target 2D: Graphing Linear Piecewise Functions PLAYER A

<p>SUPER Genius: Level ***</p>	<p>Find the value of the constant K such that the piecewise defined function f is continuous at x=2.</p> $f(x) = \begin{cases} \frac{1}{2}x + 1, & x \leq 2 \\ kx, & x > 2 \end{cases}$
<p>Genius: Level ***</p>	<p>Graph; what is the domain and range of this function? EXPLAIN how you know</p> $h(x) = \begin{cases} x^2 & \text{if } x < 0 \\ x & \text{if } 0 \leq x < 5 \\ -2x + 11 & \text{if } x \geq 5 \end{cases}$
<p>Advanced: Level **</p>	<p>Write the equation for the piecewise functions whose graph is shown</p> 
<p>Baller: Level **</p>	<p>61. </p> <p>What is the domain and range of the piecewise function? Write the equation for the piecewise functions whose graph is shown</p>
<p>Proficient: Level **</p>	<p>Graph</p> $f(x) = \begin{cases} x + 1, & \text{for } x \leq -3, \\ -1, & \text{for } -3 < x < 4, \\ \frac{1}{2}x, & \text{for } x \geq 4 \end{cases}$
<p>Novice: Level *</p>	<p>Graph</p> $f(x) = \begin{cases} 3, & \text{if } -1 \leq x < 2 \\ 5, & \text{if } 2 \leq x < 4 \\ 8, & \text{if } 4 \leq x < 9 \\ 10, & \text{if } 9 \leq x < 12 \end{cases}$
<p>Rookie: Level *</p>	<p>Graph; what is the domain and range of this function? EXPLAIN.</p> $f(x) = \begin{cases} x + 6, & \text{if } x \leq -3 \\ -\frac{2}{3}x - 3, & \text{if } x > -3 \end{cases}$
<p>START HERE: Level *</p>	<p>Which of the graphs below match the piecewise function f(x)? EXPLAIN HOW YOU KNOW!</p> $f(x) = \begin{cases} 2x + 1, & \text{if } x < 1 \\ -x + 4, & \text{if } x \geq 1 \end{cases}$ <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p><b>GRAPH A</b></p> </div> <div style="text-align: center;">  <p><b>GRAPH B</b></p> </div> </div>

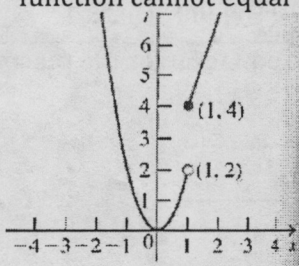
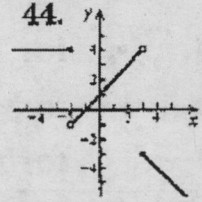
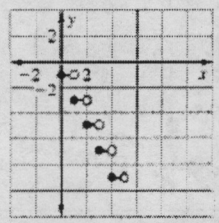
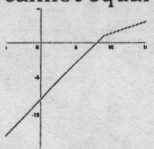
# Player A's Answers

<b>SUPER Genius:</b>	<b>K=1</b>
<b>Genius:</b>	<p style="text-align: center;">Domain: All real numbers Range: All real numbers</p> <p style="text-align: center;">Because there are no x or y values that the function cannot equal</p> <div style="text-align: center;"> </div>
<b>Advanced:</b>	$f(x) = \begin{cases} x + 2, & \text{if } x \leq -1 \\ x + 3, & \text{if } -1 < x < 1 \\ x + 1, & \text{if } 1 \leq x \end{cases}$
<b>Baller:</b>	<p style="text-align: center;">Domain: <math>(-\infty, \infty)</math>; range: <math>(-\infty, -1] \cup [2, \infty)</math>;</p> $g(x) = \begin{cases} x, & \text{for } x \leq -1, \\ 2, & \text{for } -1 < x < 2, \\ x, & \text{for } x \geq 2 \end{cases}$
<b>Proficient:</b>	<p style="text-align: center;"><b>43.</b></p> <div style="text-align: center;"> </div>
<b>Novice:</b>	<div style="text-align: center;"> </div>
<b>Rookie:</b>	<p style="text-align: center;">Domain: All real numbers Range: <math>(-\infty, 3]</math></p> <p style="text-align: center;">Because there are no x or y values that the function cannot equal</p> <div style="text-align: center;"> </div>
<b>START HERE:</b>	<b>Graph B</b>

### Learning Target 2D: Graphing Linear Piecewise Functions PLAYER B

<p>SUPER Genius: Level ***</p>	<p>Find the value of the constant K such that the piecewise defined function f is continuous at x=2.</p> $f(x) = \begin{cases} kx + 2, & x < 2 \\ x^2 + 1, & x \geq 2 \end{cases}$
<p>Genius: Level ***</p>	<p>Graph; what is the domain and range of this function? EXPLAIN how you know</p> $F(x) = \begin{cases} 2x^2 & \text{if } x < 1 \\ 3x + 1 & \text{if } x \geq 1 \end{cases}$
<p>Advanced: Level **</p>	<p>Write the equation for the piecewise functions whose graph is shown</p>
<p>Baller: Level **</p>	<p>63.  What is the domain and range of the piecewise function? Write the equation for the piecewise functions whose graph is shown below</p>
<p>Proficient: Level **</p>	<p>Graph</p> $f(x) = \begin{cases} 4, & \text{for } x \leq -2, \\ x + 1, & \text{for } -2 < x < 3, \\ -x, & \text{for } x \geq 3 \end{cases}$
<p>Novice: Level *</p>	<p>Graph</p> $f(x) = \begin{cases} -1, & \text{if } 0 \leq x < 1 \\ -3, & \text{if } 1 \leq x < 2 \\ -5, & \text{if } 2 \leq x < 3 \\ -7, & \text{if } 3 \leq x < 4 \\ -9, & \text{if } 4 \leq x < 5 \end{cases}$
<p>Rookie: Level *</p>	<p>Graph; what is the domain and range of this function? EXPLAIN</p> $f(x) = \begin{cases} x - 8, & \text{if } x < 9 \\ \frac{1}{3}x - 2, & \text{if } x \geq 9 \end{cases}$
<p>START HERE: Level *</p>	<p>Which of the graphs below match the piecewise function f(x)? EXPLAIN</p> $f(x) = \begin{cases} 2x, & \text{if } x \geq 1 \\ -x + 3, & \text{if } x < 1 \end{cases}$ <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p><b>GRAPH A</b></p> </div> <div style="text-align: center;"> <p><b>GRAPH B</b></p> </div> </div>

# Player B's Answers

SUPER Genius:	K=3/2
Genius:	<p style="text-align: center;">Domain: All real numbers Range: <math>[0, \infty)</math></p> <p style="text-align: center;">Because there are no x or y values that the function cannot equal</p> <div style="text-align: center;">  <p style="font-size: small;">Graph of <math>y = F(x)</math></p> </div>
Advanced:	$f(x) = \begin{cases} x, & \text{if } x < 0 \text{ (or } x \leq 0) \\ 2x, & \text{if } x \geq 0 \text{ (or } x > 0) \end{cases}$
Baller:	<p style="text-align: center;">Domain: <math>[-5, 3]</math>; range: <math>(-3, 5)</math>;</p> $h(x) = \begin{cases} x + 8, & \text{for } -5 \leq x < -3, \\ 3, & \text{for } -3 \leq x \leq 1, \\ 3x - 6, & \text{for } 1 < x \leq 3 \end{cases}$
Proficient:	<p>44.</p> 
Novice:	
Rookie:	<p style="text-align: center;">Domain: All real numbers Range: All real numbers</p> <p style="text-align: center;">Because there are no x or y values that the function cannot equal</p> <div style="text-align: center;">  </div>
START HERE:	Graph A

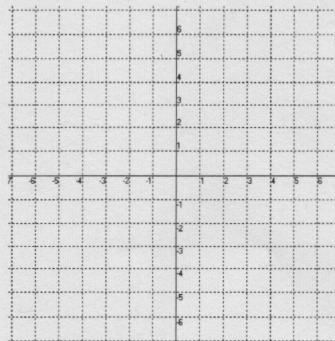
Piecewise Functions Practice  
Algebra 2 Honors

Name:  
Period:

1. For the function  $y = \begin{cases} -3x - 7 & \text{for } x \leq -3 \\ -2 & \text{for } -3 < x \leq 2 \\ x + 1 & \text{for } x > 2 \end{cases}$ , answer the following questions.

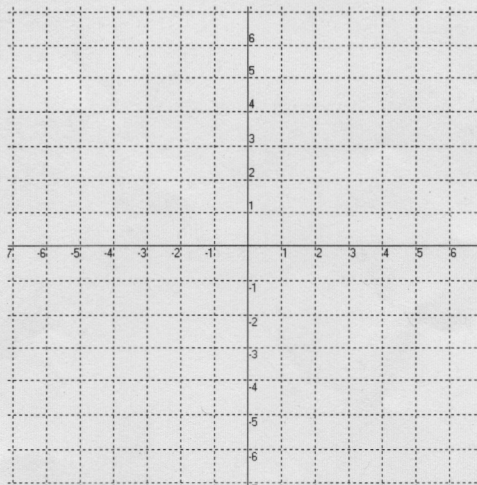
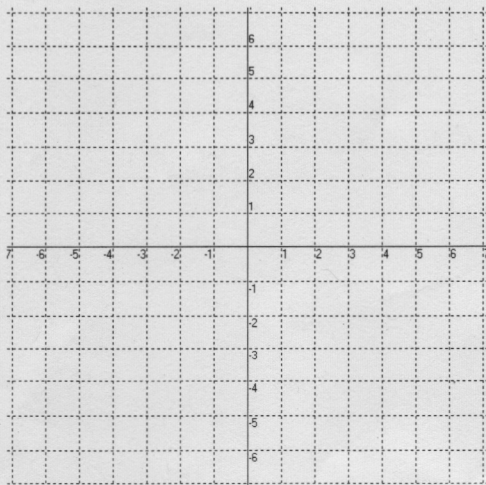
a. What are the three different equations that make up this piecewise function?

b. Graph the piecewise function



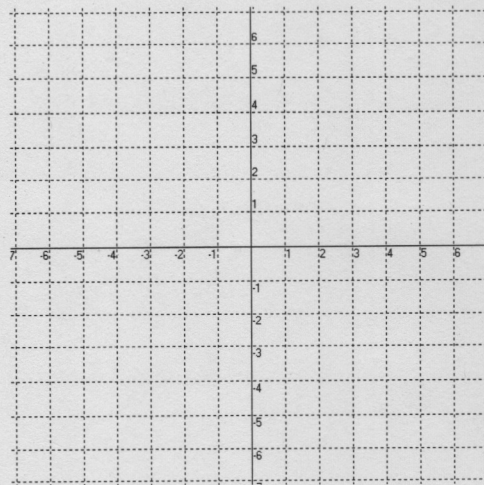
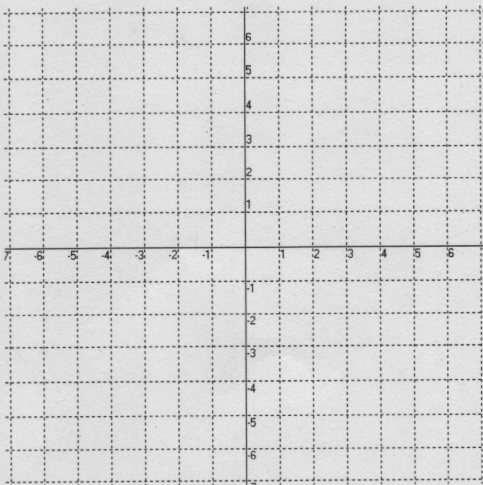
2.  $y = \begin{cases} -2x + 1 & \text{for } x < -2 \\ x - 3 & \text{for } -2 \leq x < 3 \\ -4 & \text{for } x \geq 3 \end{cases}$

3.  $y = \begin{cases} -1x - 1 & \text{for } x < -2 \\ -3|x - 2| + 4 & \text{for } -1 \leq x < 4 \\ 5 & \text{for } x \geq 4 \end{cases}$



$$4. y = \begin{cases} 2[[x+5]]+1 & \text{for } x < -2 \\ 0 & \text{for } -2 \leq x < 3 \\ 2|x-5|-3 & \text{for } x \geq 4 \end{cases}$$

$$5. y = \begin{cases} 3x+10 & \text{for } x < -2 \\ -2x+4 & \text{for } -1 \leq x < 3 \\ x-2 & \text{for } x \geq 4 \end{cases}$$



6. Describe the transformation that occurs as the absolute function  $y = 3|x - 4| + 2$  is translated (moved) to  $y = 3|x + 5| - 2$ .

7. Write the equation of the absolute function  $y = -2|x - 3| + 1$  as it is translated 4 units to the left and 10 units up.

8. Write the equation of a step function that has the following characteristics

Steps are going down and are 3 units apart  
The steps are shifted 4 units left and 3 units up

Name \_\_\_\_\_

Period \_\_\_\_\_

### Worksheet - Piecewise Functions

Evaluate the following for  $f(x) = \begin{cases} 3x - 5, & x > 4 \\ x^2, & x \leq 4 \end{cases}$ :

1.  $f(7)$

2.  $f(4)$

3.  $f(-3)$

Evaluate the following for  $f(x) = \begin{cases} -2|x+1|, & x \leq 1 \\ 3, & 1 < x < 3 \\ 6-2x, & x \geq 3 \end{cases}$ :

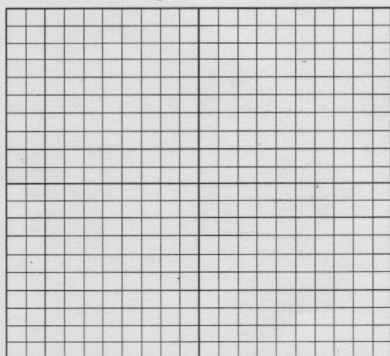
4.  $f(10)$

5.  $f(2)$

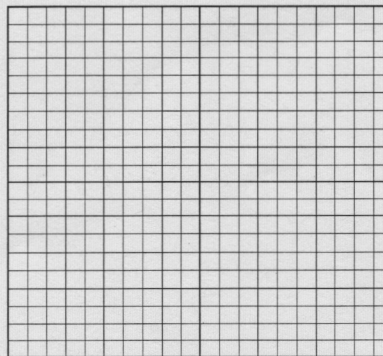
6.  $f(0)$

Graph the following piecewise functions.

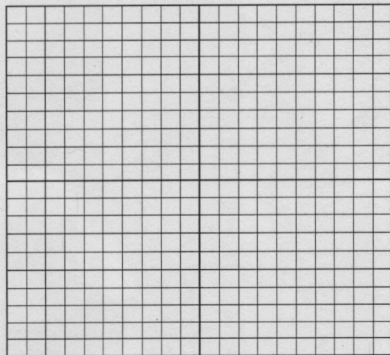
7.  $f(x) = \begin{cases} -2, & x < 0 \\ 3, & x \geq 0 \end{cases}$



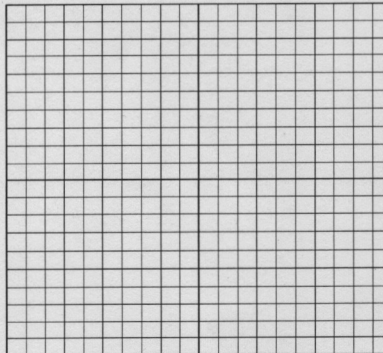
8.  $g(x) = \begin{cases} -x+2, & x < 2 \\ x-2, & x \geq 2 \end{cases}$



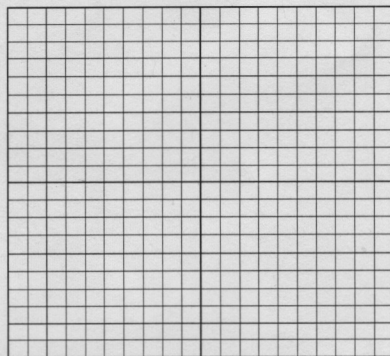
$$9. h(x) = \begin{cases} -3x+2, & x \leq 2 \\ \frac{1}{2}x-4, & x > 2 \end{cases}$$



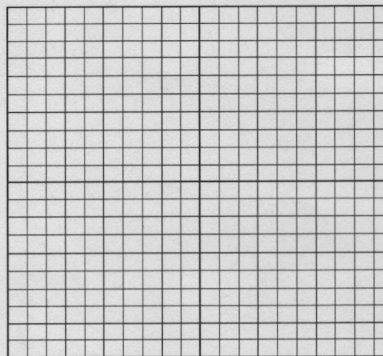
$$10. f(x) = \begin{cases} 4, & x \leq -2 \\ x^2, & -2 < x < 2 \\ 4, & x \geq 2 \end{cases}$$



$$11. g(x) = \begin{cases} 3x+12, & x \leq -3 \\ |x|, & -3 < x < 3 \\ -3x+12, & x \geq 3 \end{cases}$$



$$12. h(x) = \begin{cases} x^2 - 4, & x < 3 \\ \frac{2}{3}x - 5, & x \geq 3 \end{cases}$$



13. Which of the piecewise functions are continuous?

14. Which of the piecewise functions are discontinuous?

### Piecewise functions using various parent functions

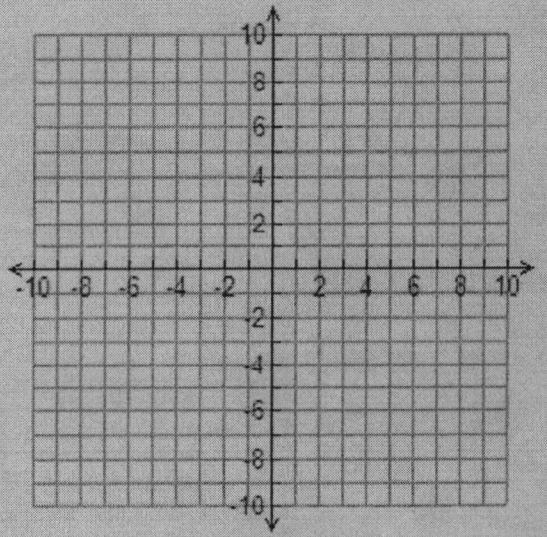
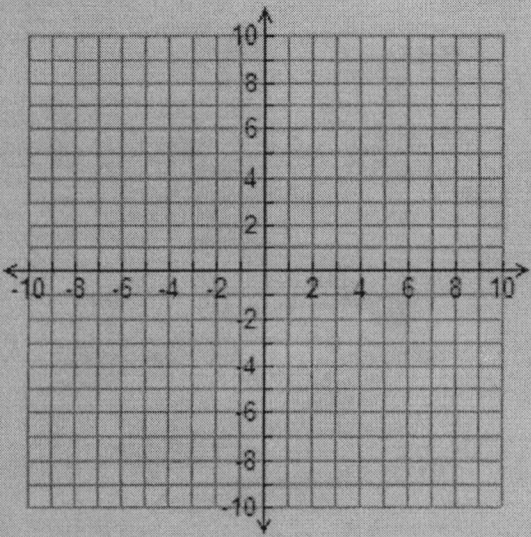
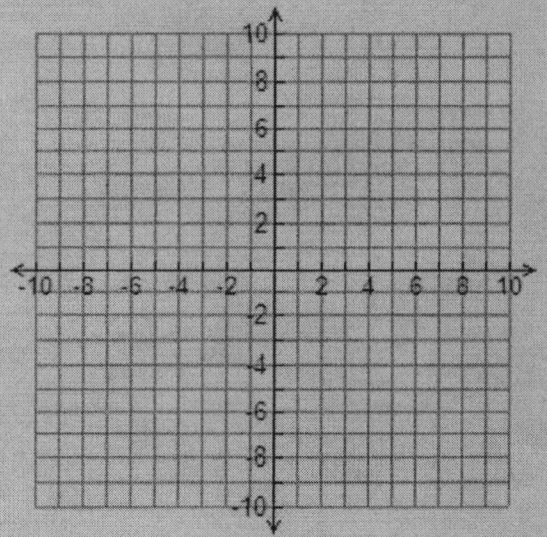
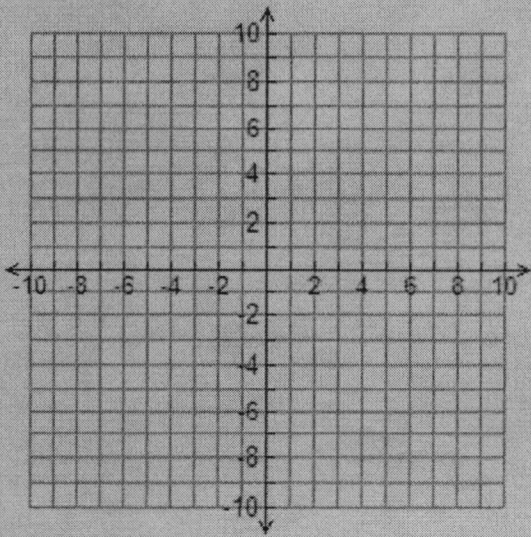
Graph the following piecewise functions. Make your graphs precise using at least three points per "piece".

$$1. f(x) = \begin{cases} (x-5)^2 - 3 & x \geq 3 \\ (x+1)^{1/2} + 1 & -1 < x < 3 \\ -2|x+4| + 2 & x \leq -1 \end{cases}$$

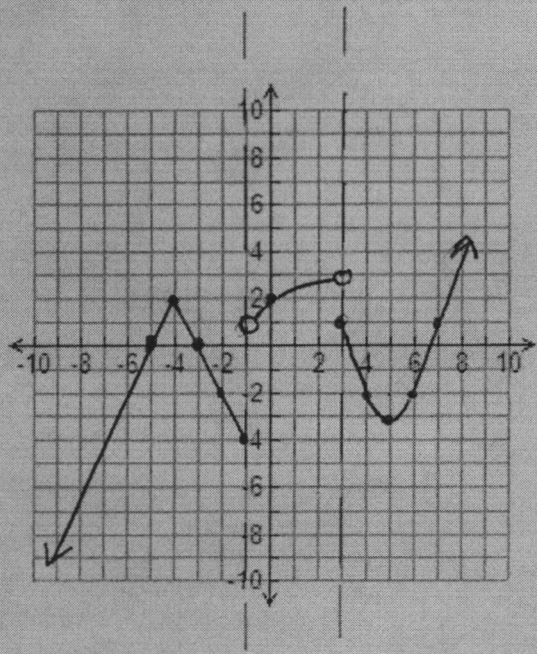
$$2. f(x) = \begin{cases} -(x+6)^2 + 6 & x \leq -2 \\ 3x + 2 & -2 < x < 1 \\ \log_2(x-3) & x > 1 \end{cases}$$

$$3. f(x) = \begin{cases} (x-6)^2 + 2 & x > 4 \\ \sqrt[3]{x+4} - 8 & -4 < x < 4 \\ -(x+6)^3 & x < -4 \end{cases}$$

$$4. f(x) = \begin{cases} -\frac{1}{2}(x+5)^2 + 7 & x \leq -1 \\ (x-1)^2 - 3 & -1 < x < 2 \\ -|x-1| + 9 & x > 2 \end{cases}$$

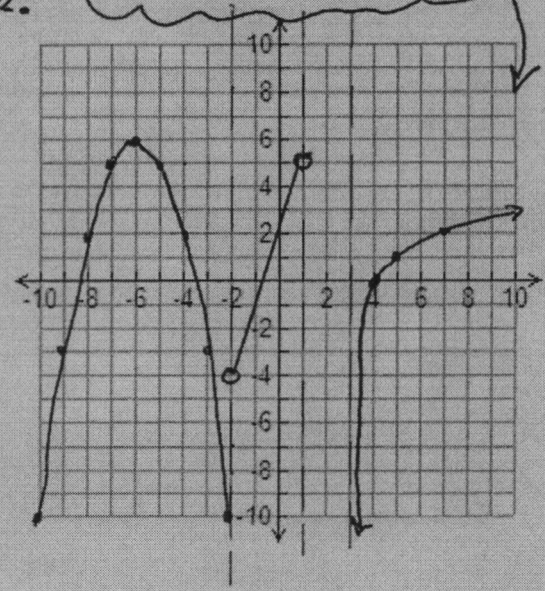


1.

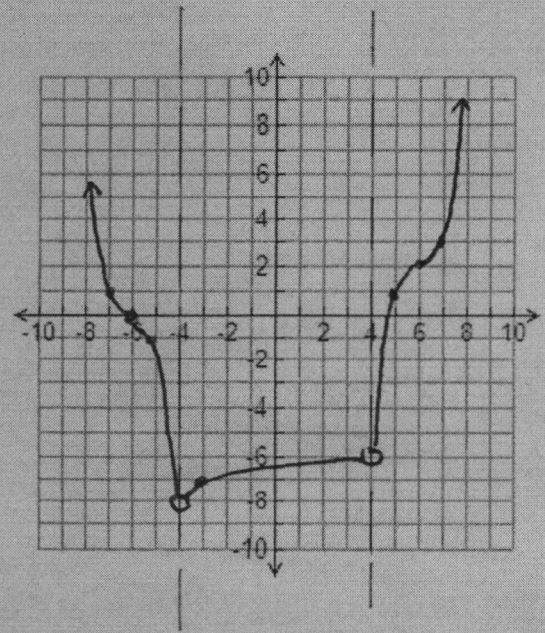


2.

remember for  $y = \log_b(x)$   
 $x \neq 0$  or negative so  
 asymptote is at  $x = 3$



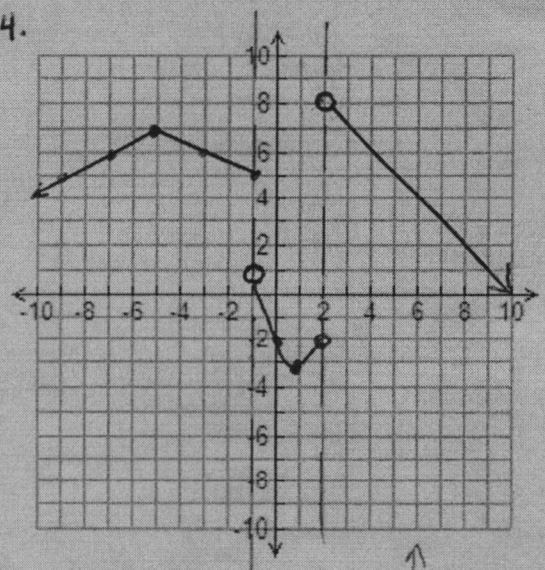
3.



make table of values  
 to help make graph precise  
 for  $\sqrt[3]{x+4} - 8$

x	y
-4	-8
-3	-7
4	-6

4.



for  $-|x-1| + 9$   
 it looks like a  $\curvearrowright$   
 but only half of it shows  
 up because of domain  
 restriction

