Pre-AP Algebra 2
Lesson 1-6 – Piecewise Functions

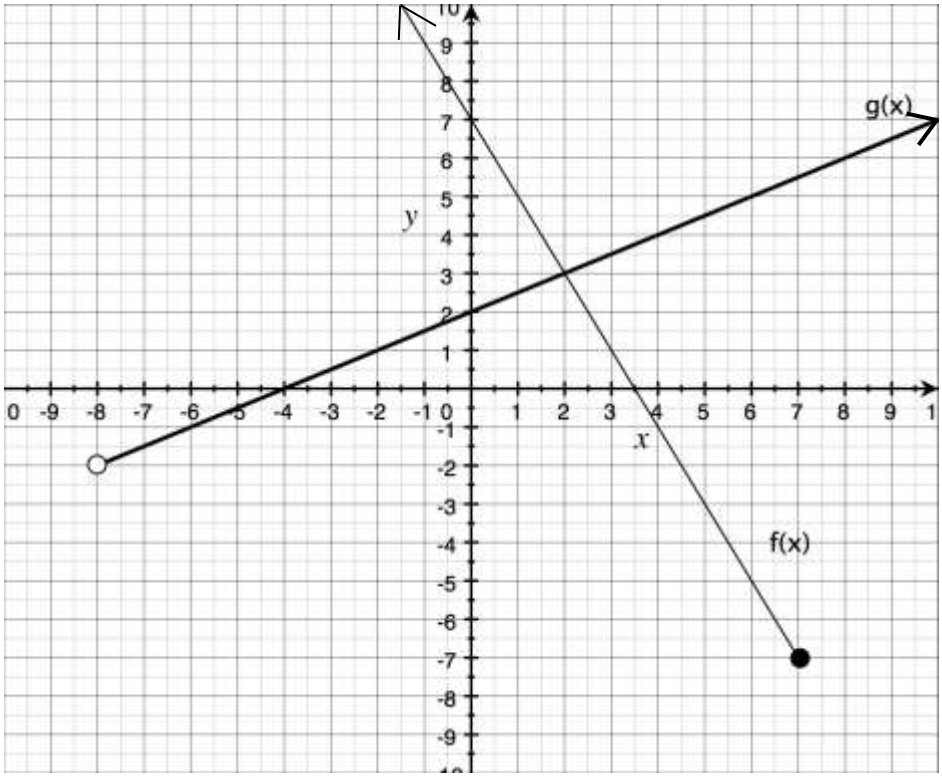
Objectives: The students will practice answering graphical analysis questions (focus on absolute value questions), including operations with two functions on the same set of axes. The students will be able to graph a piecewise function (using only linear components).

Materials: Hw #1-5 answers; tally sheets; Do Now, Note-taking template; Pairwork; homework #1-6

Time	Activity
10 min	**Homework Review** Students check their answers to hw #1-5 and discuss work with their group. Pass around a tally sheet for questions (one from each side of the room to speed it up).
5 min	**Homework Presentations** Review the top 2 or 3 questions from the tally sheet.
15 min	**Do Now** Hand out the class work packet. Students do the first page: **Graphical Analysis Practice**. Show answers on the overhead and discuss in the last 5 minutes.
15 min	**Direct Instruction** Pass out the Piecewise Functions special note-taking template. **Concepts:** - Piecewise Function o Made up of more than one equation. o Each equation has a **condition** (piece of the domain) that tells you where to graph it - To graph a piecewise function o Look at each equation separately o Graph it, making sure to only draw it in the correct part of the domain o Check the ends – draw an arrow or an open/closed circle, as appropriate. **Examples:** Walk students through graphing each of the examples.
20 min	**Pair Work** Students practice **graphing linear functions in a restricted domain**, using inequality notation for the domain and range. All functions are given in slope-intercept form, and it includes horizontal lines. Show answers on the overhead and discuss in the last 5 minutes.

Homework #1-7: Graphing Piecewise Functions

Do Now: Graphical Analysis Practice



1) What is the domain of f(x)?

2) What is the domain of g(x)?

3) What is the range of f(x)?

4) What is the range of g(x)?

5) g(5) + f(5) =

6) f(2) × g(2) =

7) |f(6)| =

8) g(|-6|) =

9) |g(-6)| – |f(0)| =

10) f(3.5) × g(3.5) =

11) g(4) – f(4) =

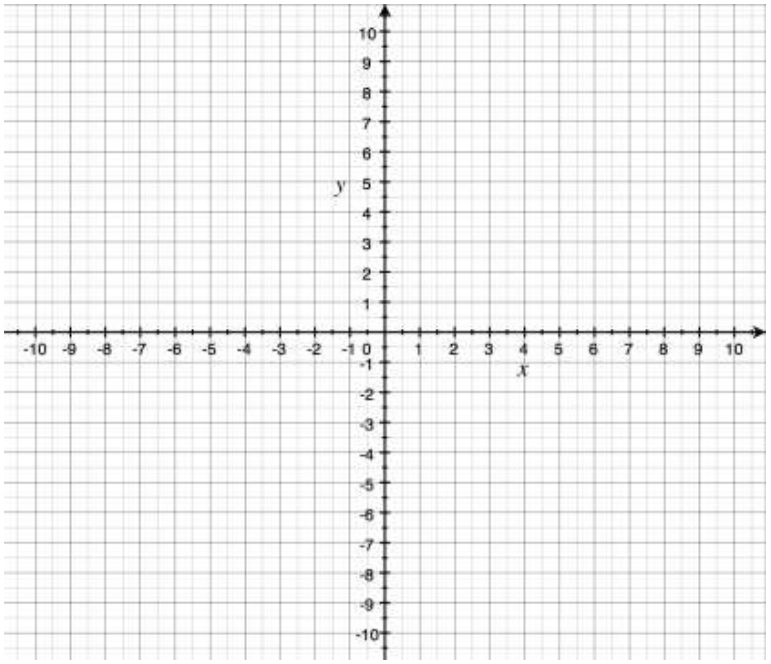
12) f(g(0)) =

Graphing a Piecewise Function

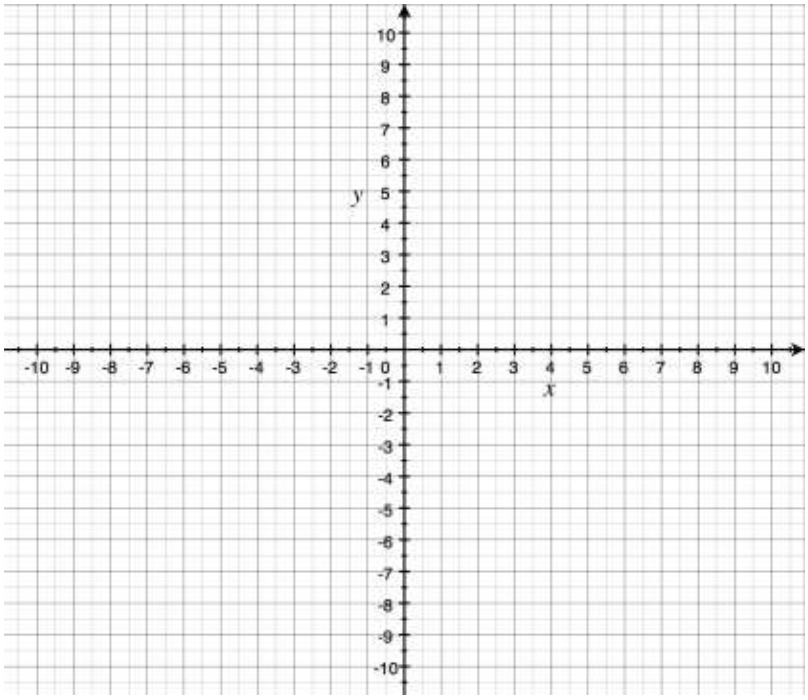
Make a graph of f(x). To help you, think of each piece of the function as a separate problem (like the ones on the previous pages), but all graphed together on the same coordinate plane.

Be careful with the ends of each piece – think about whether you need an arrow, a closed circle, or an open circle. **Use a ruler to draw your lines**.

$$f(x)=\begin{cases} 2x+4 & \text{if } x>-2 \\ -3x-9 & \text{if } x\le -2 \end{cases}$$

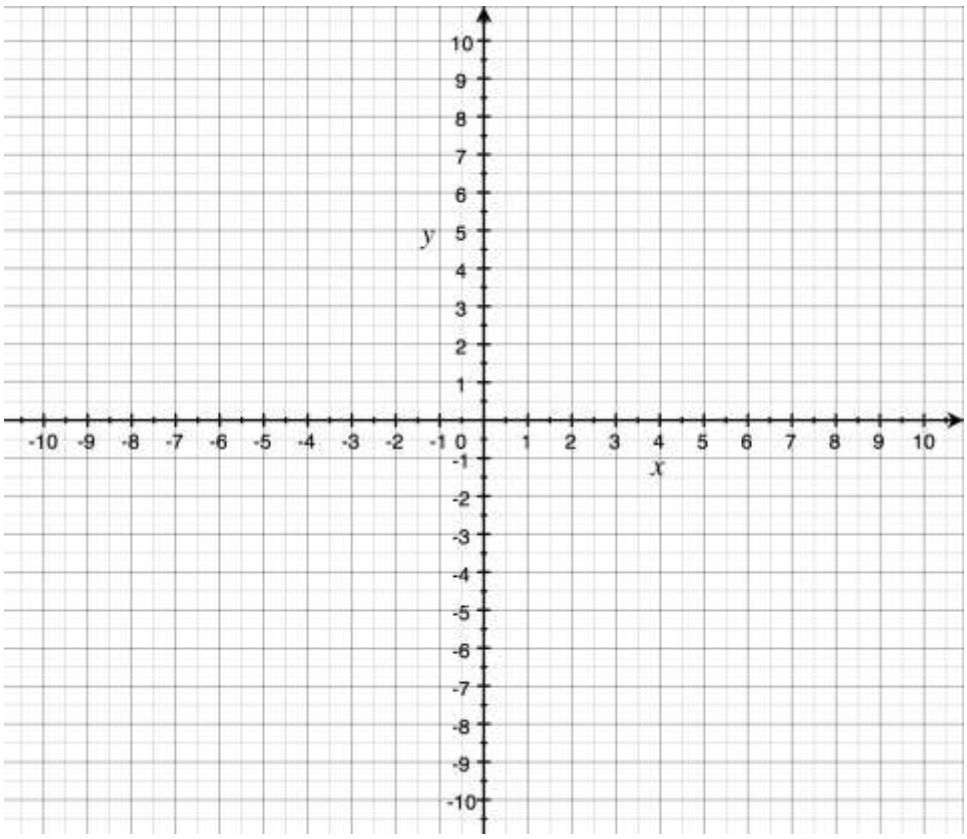


$$f(x)=\begin{cases} -\frac{1}{2}x+2, & x<-4 \\ 2, & x=-4 \\ 2x+5, & -4<x<1 \\ 7, & x\ge 1 \end{cases}$$



Pre-AP Algebra 2
Lesson 1-6 - Notes

$$f(x)=\begin{cases}2x-3, & x<1\\ 4, & 1\le x<6\\ -\frac{1}{2}x+9, & x\ge 6\end{cases}$$



When you finish, answer the following questions by using your graph:

1) f(-1) =
2) f(0) =
3) f(½) =
4) f(1) =
5) f(1.2) =
6) f(5.9) =
7) f(6) =
8) f(8) =

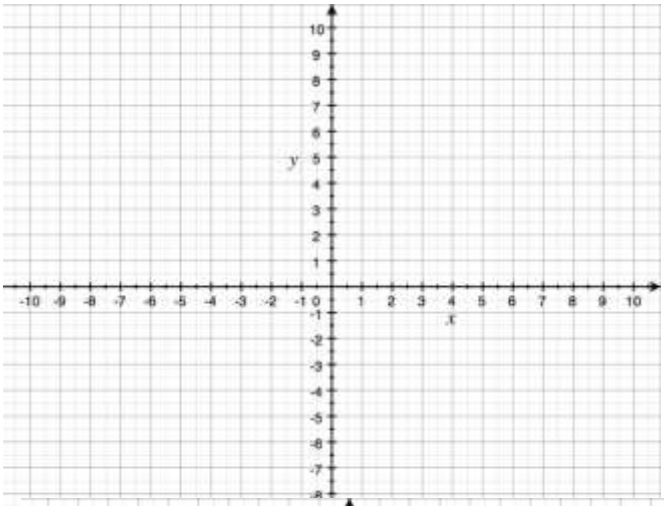
Challenge! Can you figure out how to find exact values for the following?

1) f(-15) =
2) f(8.4) =
3) f(100) =

Pre-AP Algebra 2
Lesson 1-6 - Pairwork

Graph the following functions by hand and find the domains, ranges, and zeroes. Calculate the designated function values for each.

(1) $f(x)=\begin{cases} 3x+2 & \text{if } x>1 \\ -4x-2 & \text{if } x\le 1 \end{cases}$

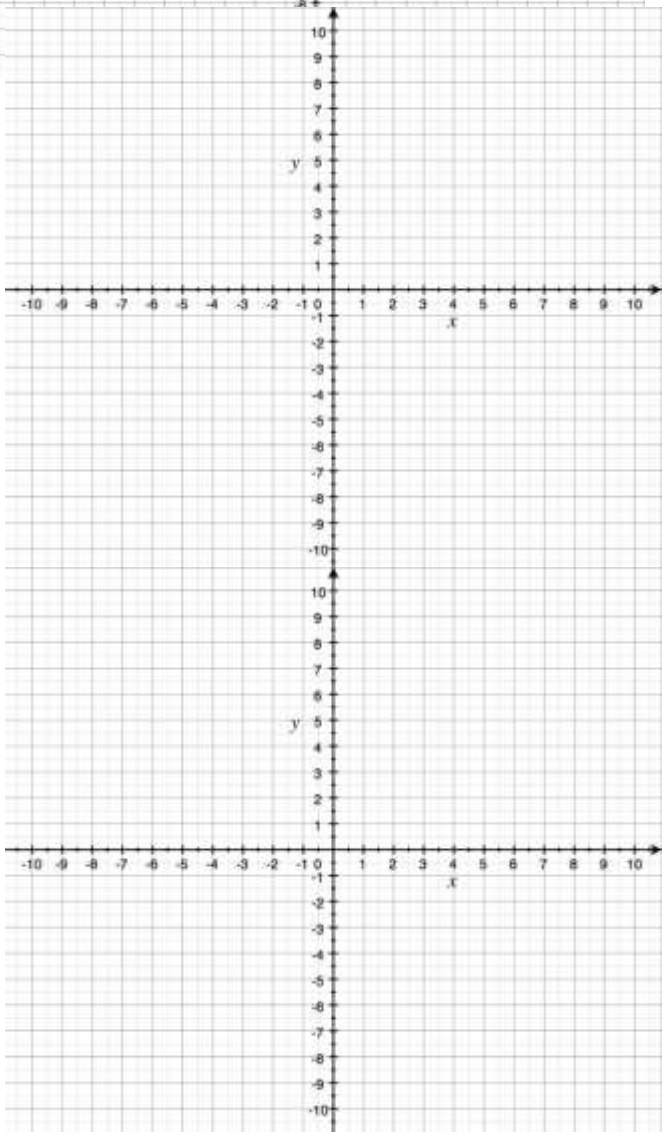


Domain:_____

Range:_____

Find
f(3)=
f(1)=
f(0)=

(2) $g(x)=\begin{cases} -\frac{3}{4}x-1 & \text{if } x\ge 0 \\ -2x & \text{if } x<0 \end{cases}$,



Domain:_____

Range:_____

Find
g(4)=
g(0)=
g(–2)=

(3) $h(x)=\begin{cases} -\frac{1}{2}x+2 & x<-4 \\ 2 & x=-4 \\ 2x+5 & -4<x<1 \\ 7 & x\ge 1 \end{cases}$,

Domain:_____

Range:_____

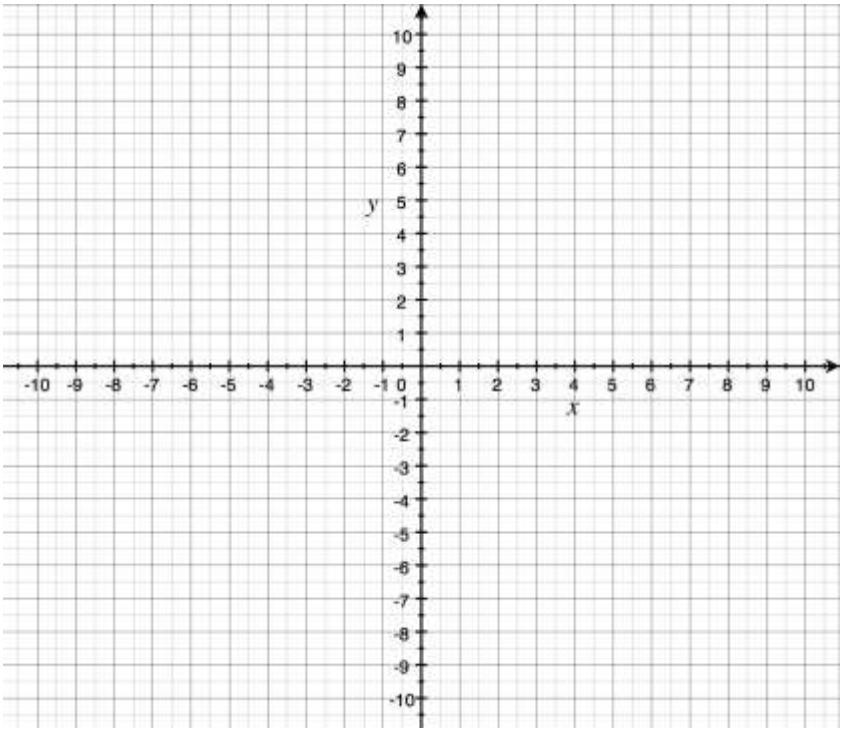
Find
h(-4)=
h(0)=
h(12)=

Pre-AP Algebra 2 **Name**_____
Lesson 1-6 – Homework

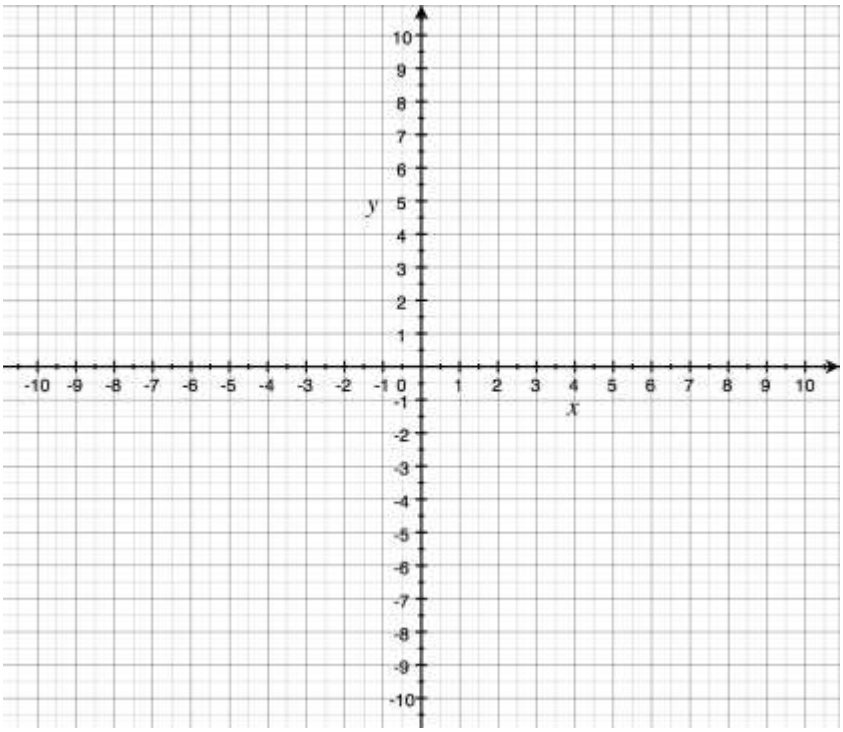
Graphing Piecewise Functions

Graph each function on the coordinate plane.

1) $f(x)=\begin{cases}-2, & x\le -3\\ 5, & -3<x\le 3\\ \frac{1}{3}x-6, & x>3\end{cases}$



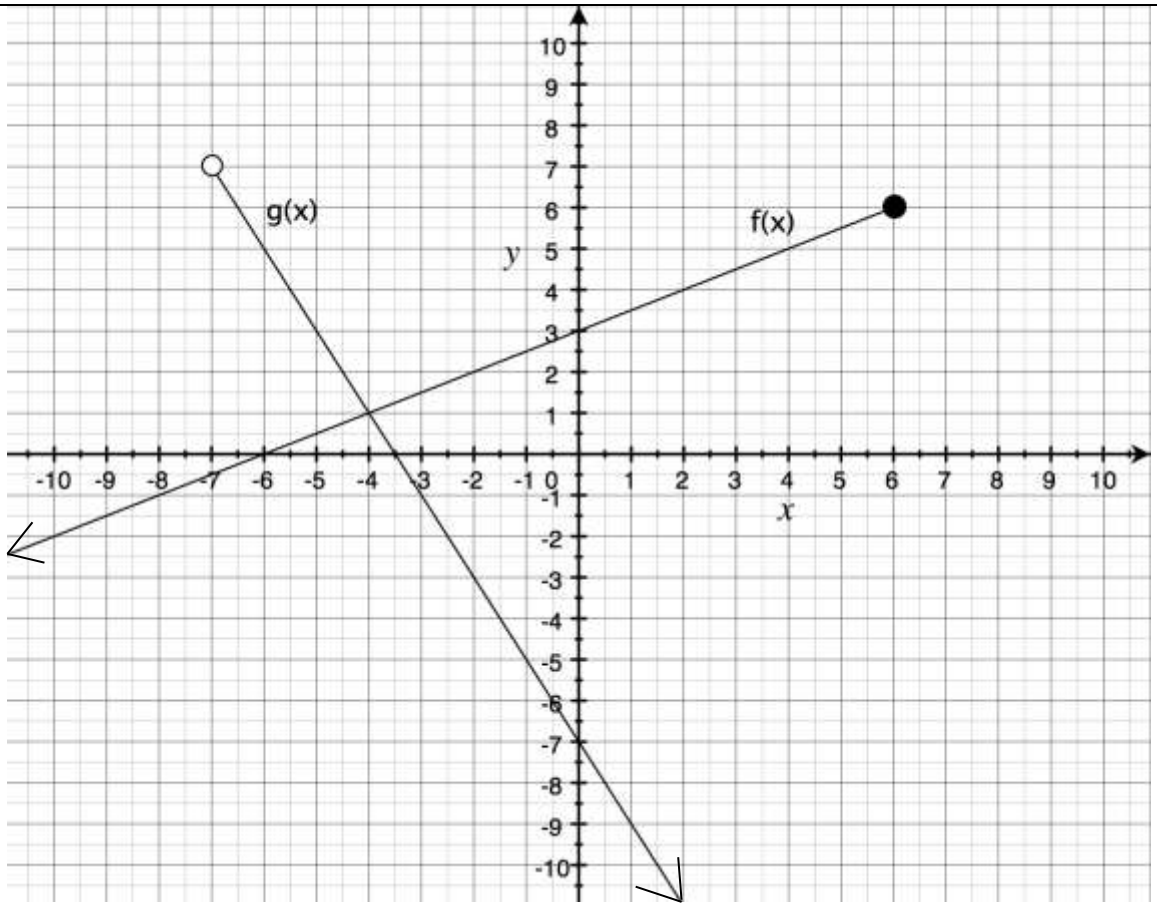
2) $f(x)=\begin{cases}2x, & x<-1\\ -2x+7, & -1\le x\le 6\\ -5, & x>6\end{cases}$



→

Pre-AP Algebra 2 **Name**_____

Lesson 1-6 – Homework



3) What is the domain of f(x)?

4) What is the domain of g(x)?

5) What is the range of f(x)?

6) What is the range of g(x)?

7) g(-2) + f(-2) =

8) g(1) – f(1) =

9) |f(-8)| =

10) |g(0)| =

11) g(-5) ÷ f(-5) =

12) f(-6) × g(-6) =

13) $(f \circ g)(-6)$=

14) $(g \circ f)(-6)$=

Bonus: +1 each

On the same coordinate plane above, make a graph of $|f(x)|$ and $|g(x)|$.