Piecewise Functions

A piecewise function is a function that has more than one "part" or "piece" to it. Each piece is defined for a specific domain (with no overlap!).

Examples:

1. Given,

$$f(x)=\begin{cases} x^2 ; x<2 \\ 3x-2;\ 2\le x<7 \\ -\frac{1}{2}x+10 ; x\ge 8 \end{cases}$$

evaluate the function for the given values.

*use rule where input is defined!!!!!

$f(-1)=(-1)^2$
$=1$

$f(10)=-\frac{1}{2}(10)+10$
$=-5+10=5$

$f(1)=1^2$
$=1$

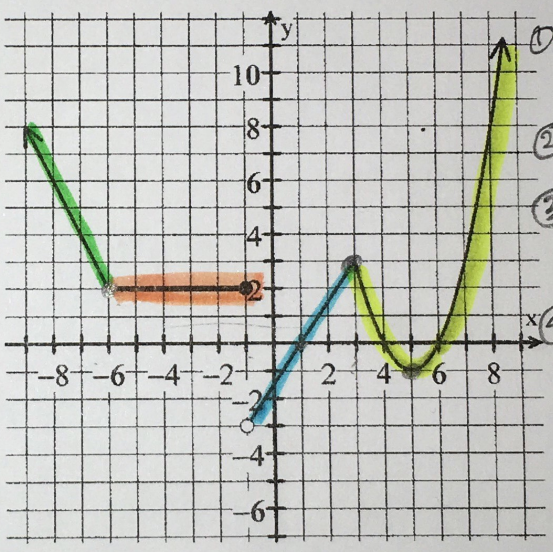
$f(5)=3(5)-2$
$=15-2$
$=13$

$f(2)=3(2)-2$
$=6-2$
$=4$

$f(7)=$ undefined

2. Write the function to represent the graph given at left.

$$f(x)=\begin{cases} -2(x+6)+2 ; x<-6 \\ 2 \quad ; -6\le x\le -1 \\ \frac{3}{2}(x-1) ; -1<x\le 3 \\ (x-5)^2-1 ; x>3 \end{cases}$$



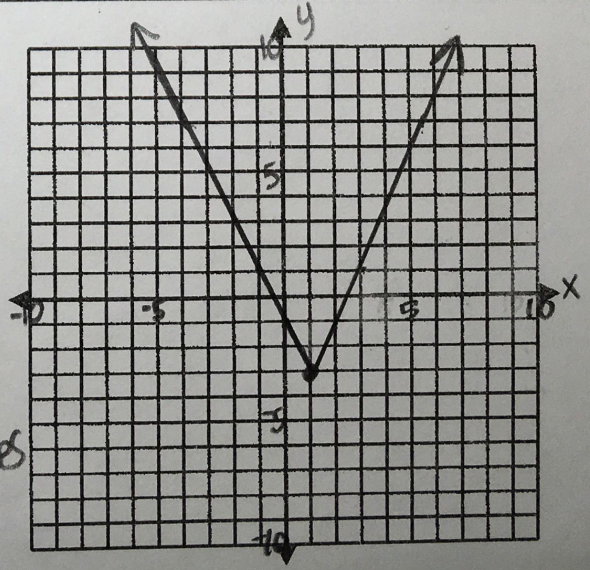
① linear $m=-2$ $(-6,2)$
② constant
③ linear $m=\frac{3}{2}$ $(1,0)$
④ quadratic vertex $(5,-1)$ $a=1$

3. Graph the function.

linear $m=-2$ point $(1,-3)$

$$f(x)=\begin{cases} -2(x-1)-3; x<1 \\ 2(x-1)-3; x\ge 1 \end{cases}$$

$m=2$; $(1,-3)$



*Note...this particular piecewise function can also be written as an absolute value function!

$f(x)=2|x-1|-3$

∴ V shape
∴ symmetry
∴ eq. same except opposite slopes

opposites in piecewise!