Transformations of Functions

For any function $f(x)$, we can generalize with what is known as parameters. Notice that a different variable is used for each type of transformation.

$f(x)$	The parent graph
$f(-x)$	Reflection across the y-axis
$-f(x)$	Reflection across the x-axis
$f(x-c)$	Phase shift to the right c units
$f(x+c)$	Phase shift to the left c units
$f(x)+d$	Vertical translation up d units
$f(x)-d$	Vertical translation down d units
$af(x), a<-1$ or $a>1$	Stretch of the y-values
$af(x), -1<a<1, a\neq 0$	Shrink of the y-values

Identify the parent graph then describe each transformation.

Functional Representation of Transformation	Description of Transformation(s)
1, $f(x)=x^2-3$	
2. $f(x)=2x^2+1$	
3. $f(x)=(x-1)^2+2$	
4. $f(x)=-x^2+2$	
5. $f(x)=-(x+1)^2-2$	
6. $f(x)=-\frac{1}{2}(x+3)^2-1$	
7. $g(x)=\sqrt{x+3}$	
8. $g(x)=\sqrt{1-x}$	
9. $g(x)=\sqrt{x-2}+1$	
10. $g(x)=-2\sqrt{x-1}+3$	