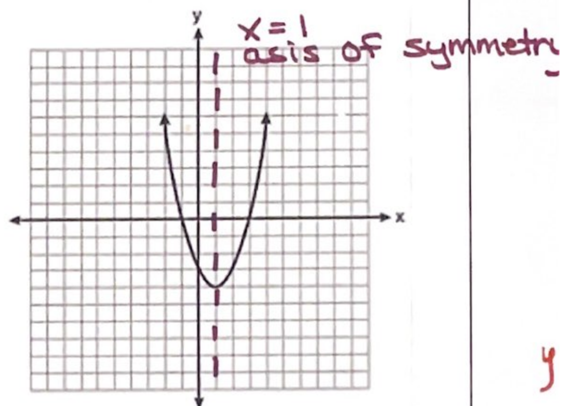
Name:	Date:	Period:

3.3 Vertex Form of Quadratics Notes

Vertex Form of a Quadratic Function

- Three forms of a Quadratic Equations: Standard, factored, and vertex.
- **Vertex Form:** $f(x) = a(x-h)^2 + k$
- (h, k) is the vertex and $x = h$ is the axis of symmetry.
- a is the stretch factor and determines the dilation (width) and direction (opens up or down) of the parabola.



Transformation of the Parent Function

Directions: Describe the transformation of the parent function shown by the following equations.

1. $f(x) = x^2 + 9$ The graph is shifted 9 units up.	2. $f(x) = \frac{1}{3}x^2 + 2$ The graph is shifted 2 units up and is verti... compressed by factor of 1/3
3. $f(x) = -(x+5)^2$ The graph is shifted 5 units left and reflected across x axis.	4. $f(x) = -2(x+4)^2 + 3$ The graph is shifted 4 units left, 3 units up, reflected, and vertically stretched by a factor of 2.

Directions: Write the quadratic equation described

k h

5. The parabola is reflected over the x-axis and translated seven units up and three units to the right.

$-$ $+7$ -3

$$f(x) = -(x-3)^2+7$$

6. The parabola is compressed vertically by a factor of ¼ , and is translated two units up and four units to the left.

$$f(x) = \frac{1}{4}(x+4)^2+2$$

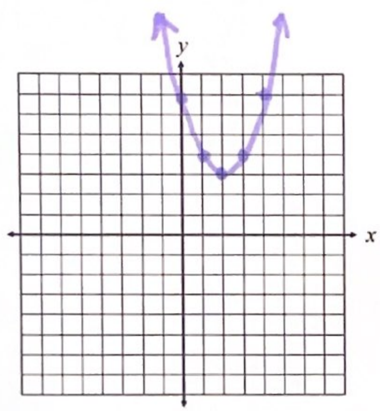
Directions: State the vertex, axis of symmetry, and the stretch factor. Then graph the parabola.

7. $f(x)=(x-2)^2+3$

$(2,3)$ $x=2$ $a=1$

outputs same as parent.

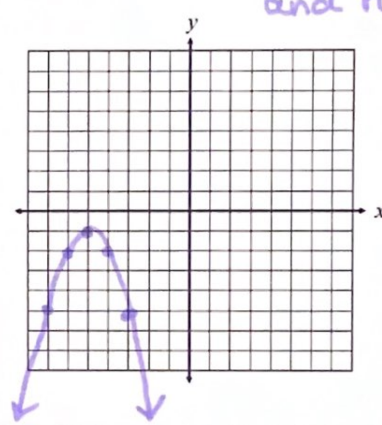
-2	
-1	
0	0
1	1
2	4
3	[illegible]



8. $f(x)=-(x+5)^2-1$

$(-5,-1)$ $x=-5$ $a=-1$

or 1 and reflec



9. $y < -2(x-2)^2$

$(2,0)$ $x=2$ $a=-2$

Test

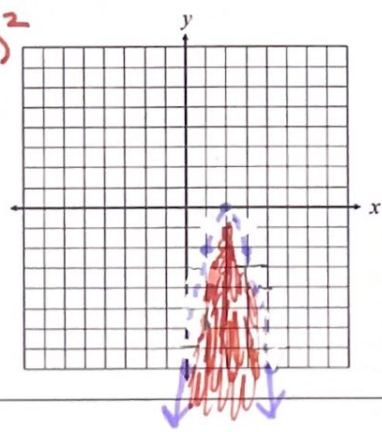
$0<-2(0-2)^2$

$0<-2(-2)^2$

$0<-2(4)$

$0<-8$

false



10. $f(x)=\begin{cases} -\frac{1}{2}x-6 & x<-2 \\ (x-1)^2-5 & x\geq -2 \end{cases}$