Pre-Calculus Notes

Parabolas - DAY ONE

<table>
<thead>
<tr>
<th>Standard Form</th>
<th>Vertex</th>
<th>Axis of Symmetry</th>
<th>Focus</th>
<th>Directrix</th>
<th>Direction Graph Opens</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>$(x-h)^2=4c(y-k)$</td>
<td>$(h,k)$</td>
<td>$x=h$</td>
<td>$(h,k+c)$</td>
<td>$y=k-c$</td>
<td>$c&gt;0 \rightarrow$ up $c&lt;0 \rightarrow$ down</td>
</tr>
<tr>
<td>$(y-k)^2=4c(x-h)$</td>
<td>$(h,k)$</td>
<td>$y=k$</td>
<td>$(h+c,k)$</td>
<td>$x=h-c$</td>
<td>$c&gt;0 \rightarrow$ right $c&lt;0 \rightarrow$ left</td>
</tr>
</tbody>
</table>

Examples: Write each parabola in standard form. Find the vertex, the axis of symmetry, the focus, the directrix, and the direction in which the parabola opens. Graph with at least 5 pts.

1. $y=-\frac{1}{8}x^2-1$
   
   
   $y+1 = -\frac{1}{8} x^2$
   
   $-8(y+1) = x^2$
   
   $-8(y+1) = (x-0)^2$
   
   $4c = -8$
   
   $c = -2 \rightarrow$ w/ $x^2 \rightarrow$ opens down

2. $(y+3)^2 = 12(x-1)$
   
   $4c = 12$
   
   $c = 3$
   
   $c = 3 \rightarrow$ w/ $y^2 \rightarrow$ opens right

3. $2y^2 - 4y + x + 4 = 0$
   
   $2y^2 - 4y = -x - 4$
   
   $2(y^2 - 2y + 1) = -x - 4 + 2(1)$
   
   $2(y-1)^2 = -x - 2$
   
   $2(y-1)^2 = -(x+2)$
   
   $(y-1)^2 = -\frac{1}{2} (x+2)$
   
   $4c = -\frac{1}{8}$
   
   $w/ y^2 \rightarrow$ opens left