# Sign Conventions

## Sign Conventions for Reflection

<table>
<thead>
<tr>
<th>$O$ is positive if object is in <strong>front</strong> of mirror (real object).</th>
</tr>
</thead>
<tbody>
<tr>
<td>$O$ is <strong>negative</strong> if object is in <strong>back</strong> of mirror (virtual object).</td>
</tr>
</tbody>
</table>

$I$ is **positive** if image is in **front** of mirror (real image).  
$I$ is **negative** if image is in **back** of mirror (virtual image).

$F$ and $R$ are **positive** if $C$ is in **front** of mirror (concave mirror).  
$F$ and $R$ are **negative** if $C$ is in **back** of mirror (convex mirror).

If $M$ is **positive**, image is **upright**.  
If $M$ is **negative**, image is **inverted**.

## Sign Conventions for Refraction

<table>
<thead>
<tr>
<th>$O$ is <strong>positive</strong> if object is in <strong>front</strong> of surface (real object).</th>
</tr>
</thead>
<tbody>
<tr>
<td>$O$ is <strong>negative</strong> if object is in <strong>back</strong> of surface (virtual object).</td>
</tr>
</tbody>
</table>

$I$ is **positive** if image is in **back** of surface (real image).  
$I$ is **negative** if image is in **front** of surface (virtual image).

$F$ and $R$ are **positive** if $C$ is in **back** of surface.  
$F$ and $R$ are **negative** if $C$ is in **front** of surface.

If $M$ is **positive**, image is **upright**.  
If $M$ is **negative**, image is **inverted**.