

Computer Graphics

Lecture 10

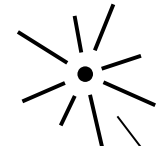
Mirrors, Specular Reflection, and Shadows

Announcements

- Don't forget to vote for your favorite artifact by noon today!
- Office hours 10-11 today, can spill into the 11-12 hour as needed.
- Feedback survey out on Canvas - fill out by Thursday at 10pm.

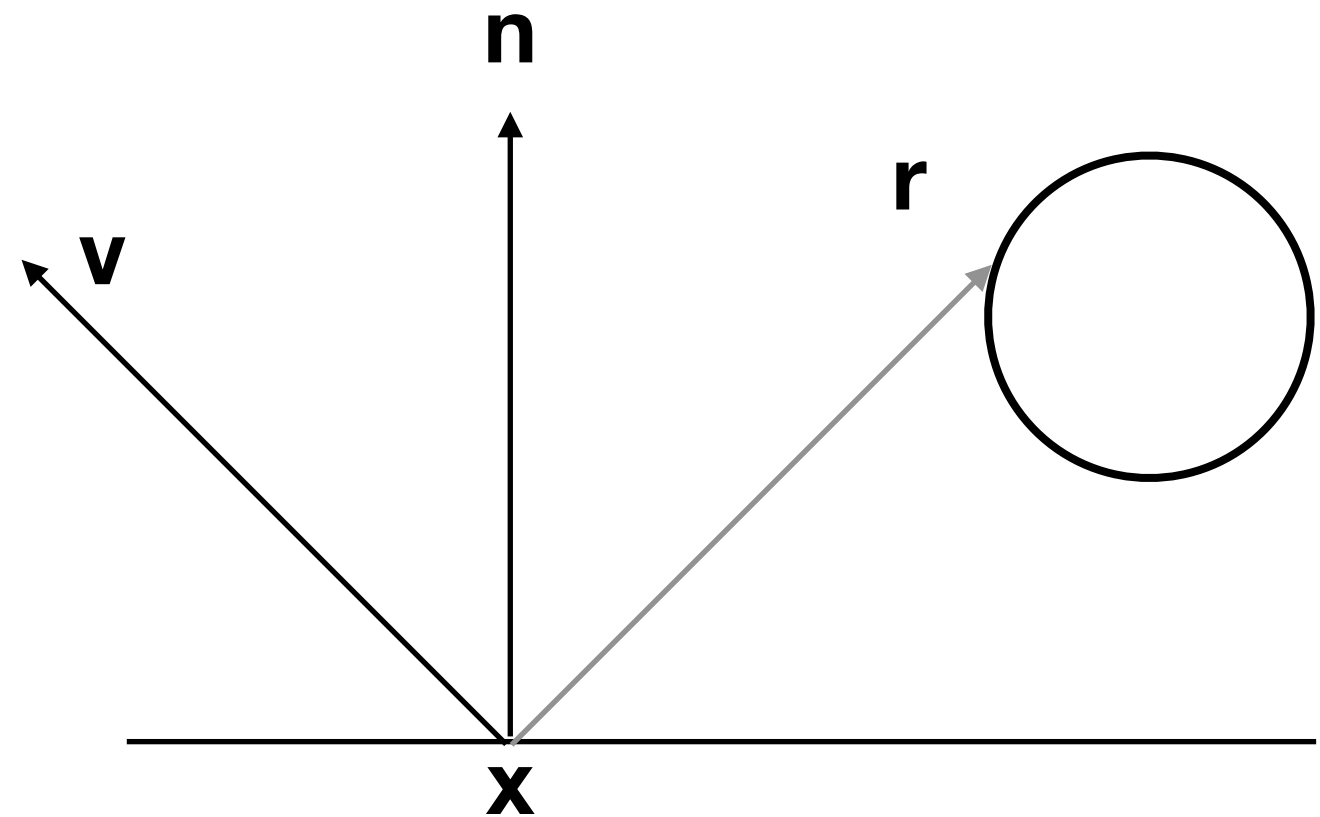
Mirror Reflection

What does a camera see when it looks at a mirror?



Calculate \vec{r} :

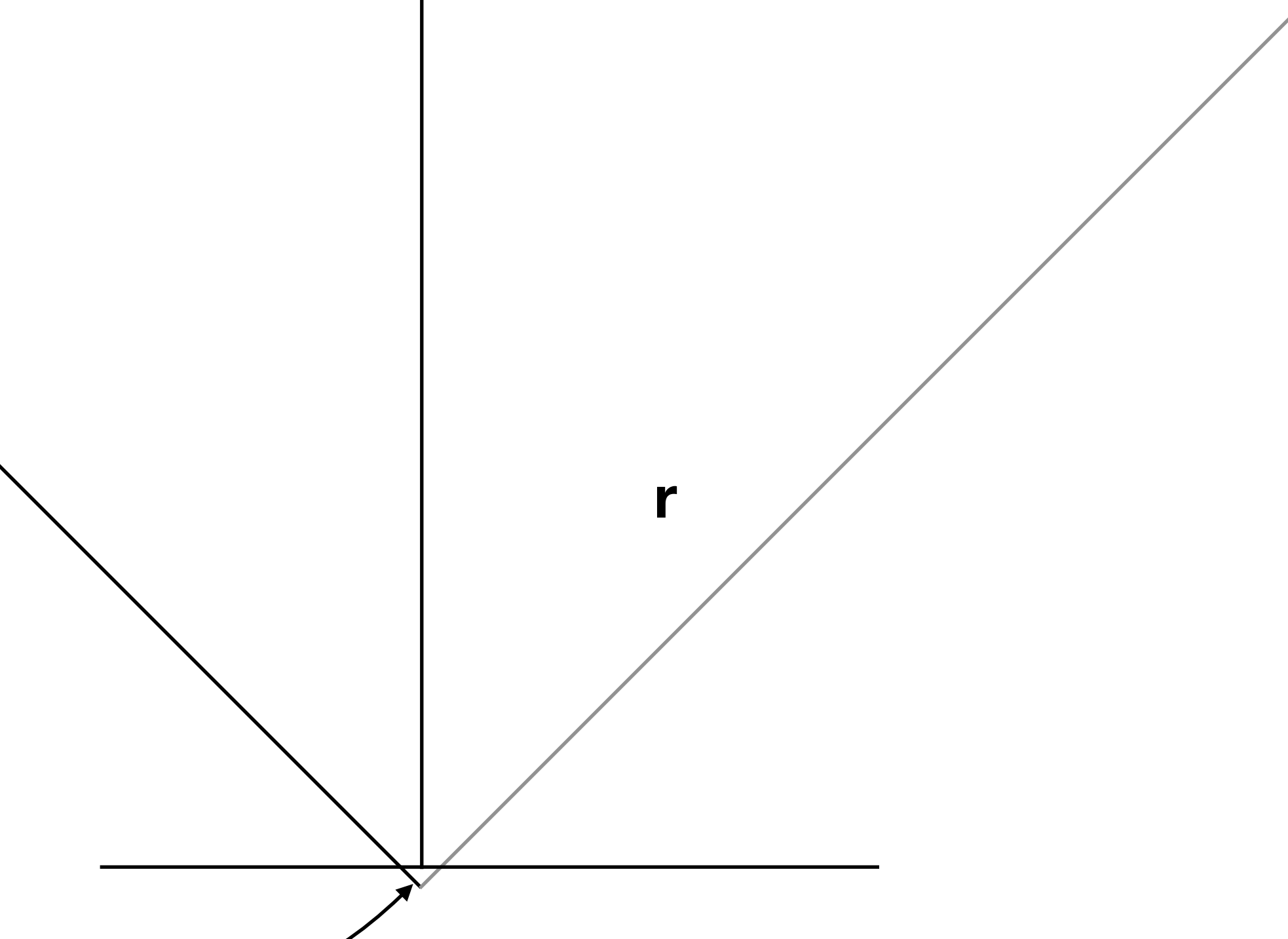
$$\vec{r} = -\vec{v} + 2(\vec{v} \cdot \vec{n})\vec{n}$$



```
mirr_ray.origin = x
```

```
mirr_ray.direction = r
```

```
color = traceray(scene, mirr_ray)
```



floating-point error!

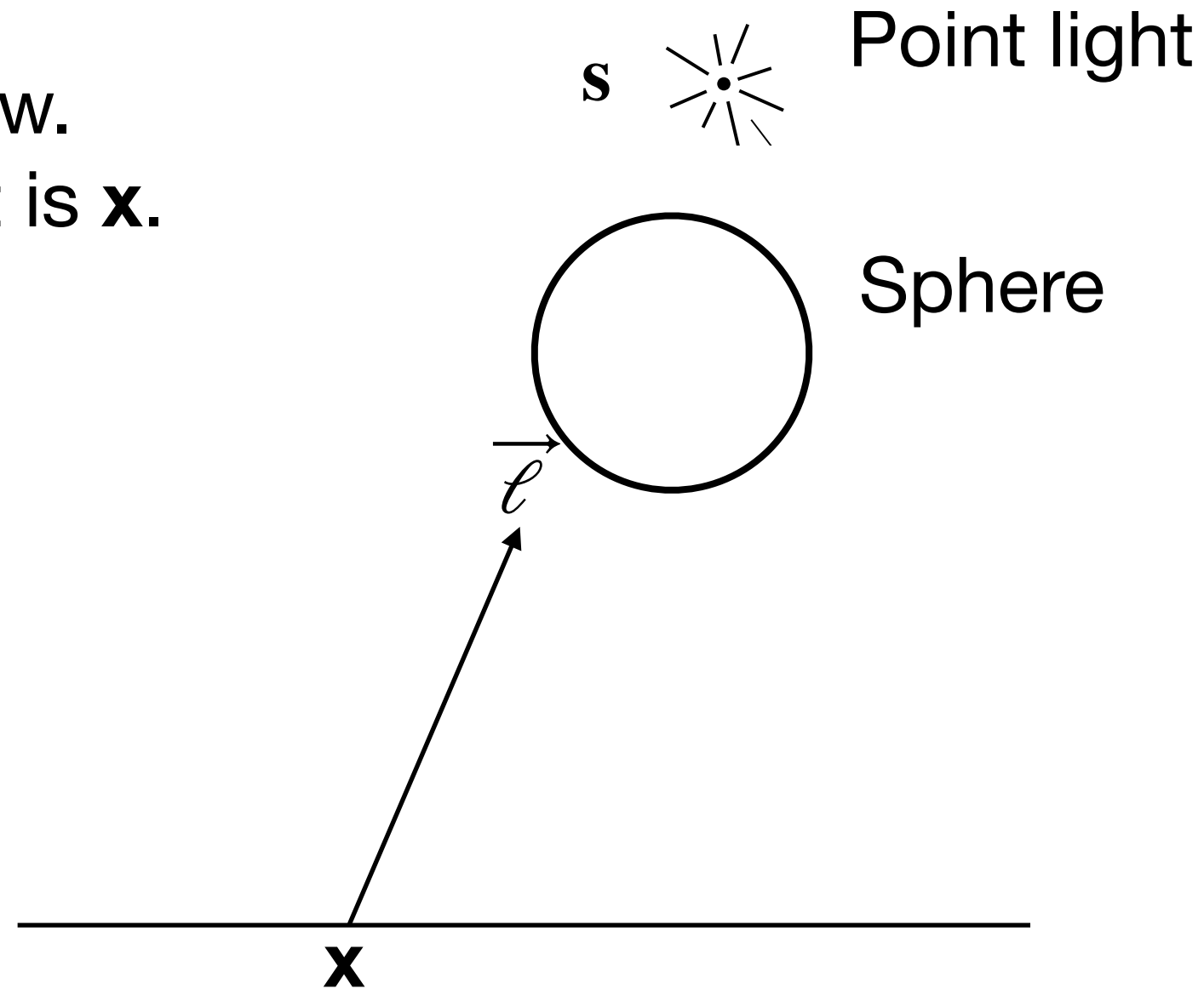
```
mirr_ray.origin = x                                tmin tmax  
mirr_ray.direction = r  
color = traceray(scene, mirr_ray, eps, Inf)
```

Shadows

How can we tell if a point is in shadow?

Problem: Fill in the table below.
Assume the intersection point is \mathbf{x} .

	Directional light $\vec{\ell}$	Point light S
<code>r.orig</code>		
<code>r.dir</code>		
<code>tmin</code>		
<code>tmax</code>		



Point is shadowed iff:

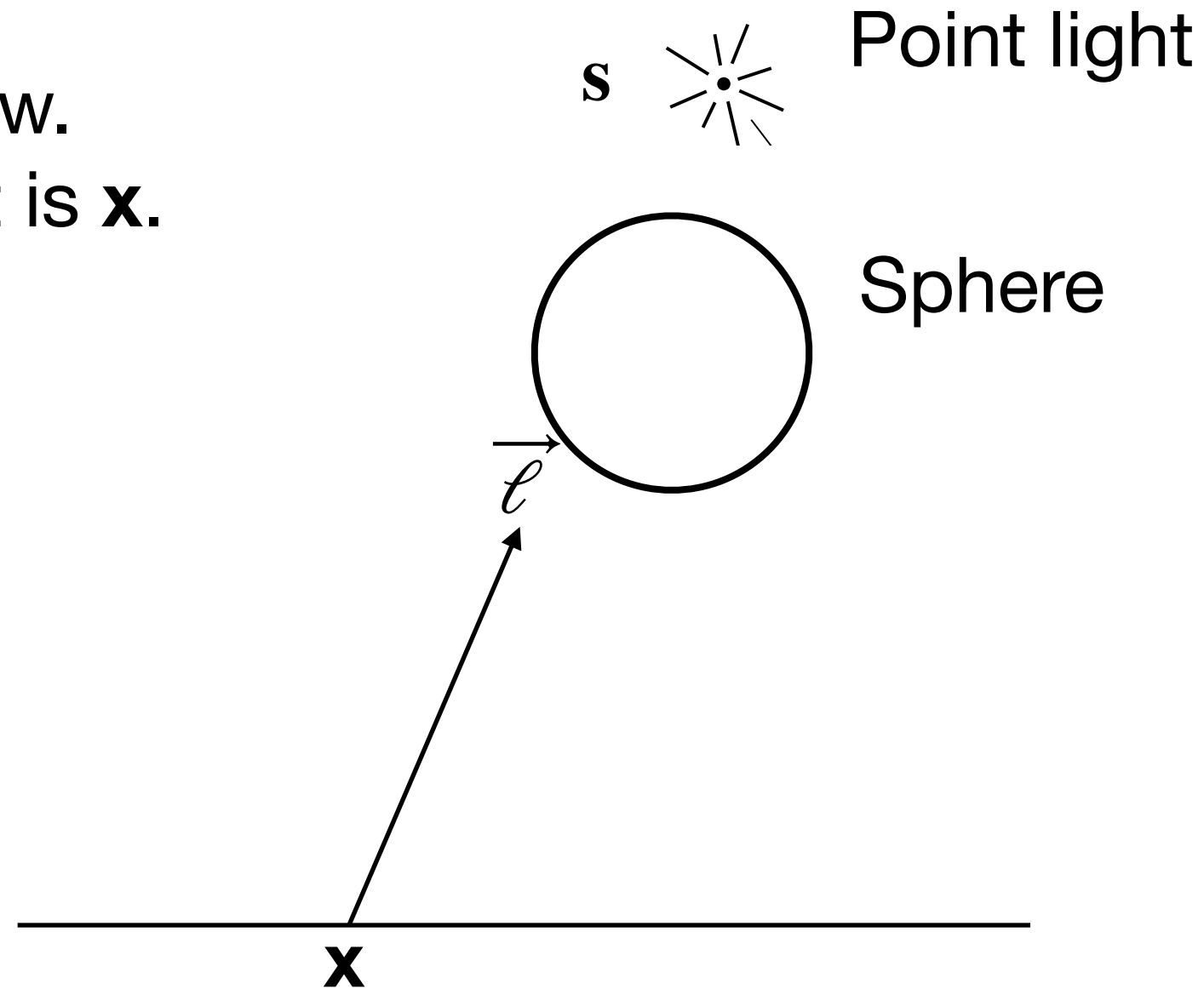
`closest_intersect(objs, Ray(orig, dir), tmin, tmax) != nothing`

Shadows

How can we tell if a point is in shadow?

Problem: Fill in the table below.
Assume the intersection point is \mathbf{x} .

	Directional light $\vec{\ell}$	Point light S
<code>r.orig</code>	\mathbf{x}	\mathbf{x}
<code>r.dir</code>	$\vec{\ell}$	$\vec{s} - \mathbf{x}$
<code>tmin</code>	eps	eps
<code>tmax</code>	Inf	1



Point is shadowed iff:

`closest_intersect(objs, Ray(orig, dir), tmin, tmax) != nothing`