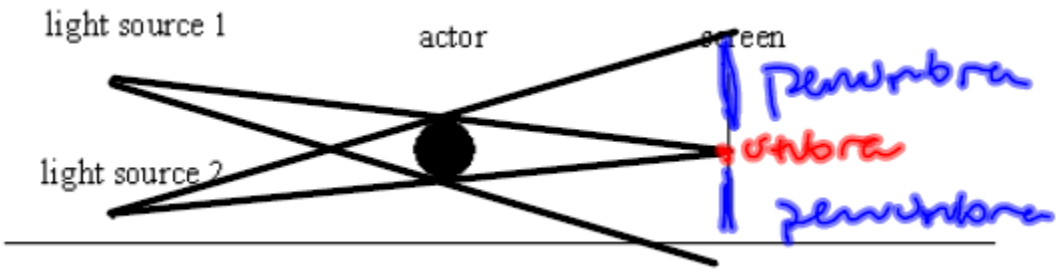
Name: _____

Practice Questions: Shadows, umbra and penumbra

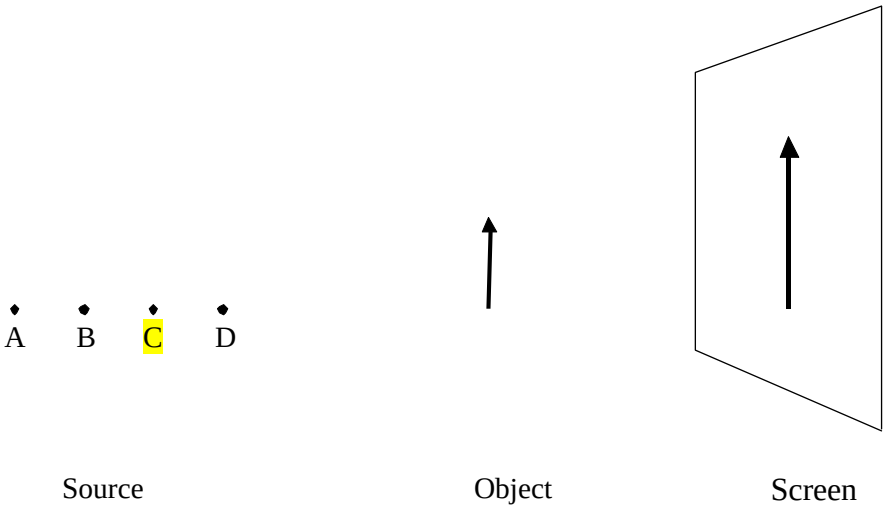
1. An actor is giving a performance.

   Two spotlights are set up in such a way that they can be considered as acting as one light source. Look at the diagram below which illustrates this set up.



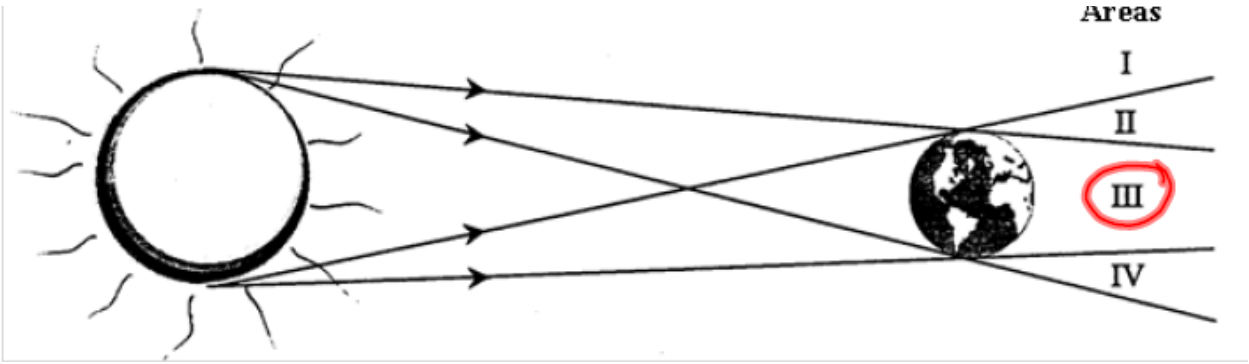
   Using the diagram above, draw a ray diagram and label the umbra and the penumbra on the screen, if applicable.

2. In the following diagram, an opaque object casts a shadow on an upright screen.
   The object is situated between a **point light source** and the screen.



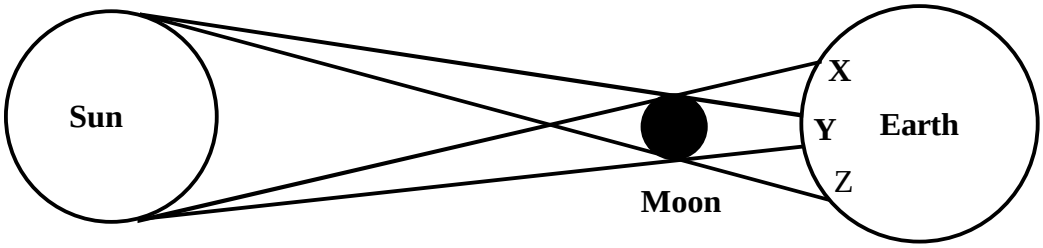
   What is the position of the light source?

3. The following diagram represents sunlight shining down on Earth.



According to the diagram above, in which area must the moon be located so that it will lie in Earth's umbra?

4. The following diagram shows the Sun, the Moon, and the Earth.



Which statements below correctly describe the shadow of the Moon on the Earth?

1. Region Y is in the Moon's penumbra.
2. Regions X and Z are in the Moon's umbra.
3. Region Y is in the Moon's umbra.
4. Regions X and Z are in the Moon's penumbra.

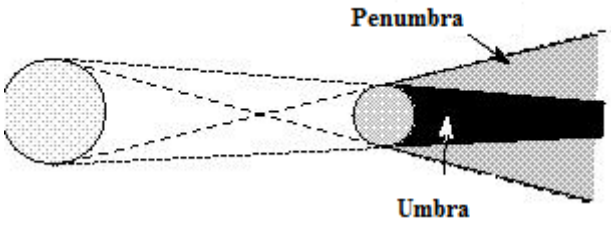
A) 1 and 2

B) 1 and 4

C) 2 and 3

D) 3 and 4

5 You are given an extended light source and an object in the following original setup.



What modification would you make in order to achieve the following results (Try drawing ray diagrams)

a. You want to make the biggest shadow possible

Move the object closer to the source

b. You want to make the smallest shadow possible

Move the object closer to the screen

c. You want to make the biggest Umbra

Move the object closer to the screen (in this case)

d. You want to make the biggest Penumbra

Move the object closer to the source

e. You want to make the smallest Umbra

Move the object closer to the source (in this case)

f. You want to make the smallest Penumbra

Move the object closer to the screen