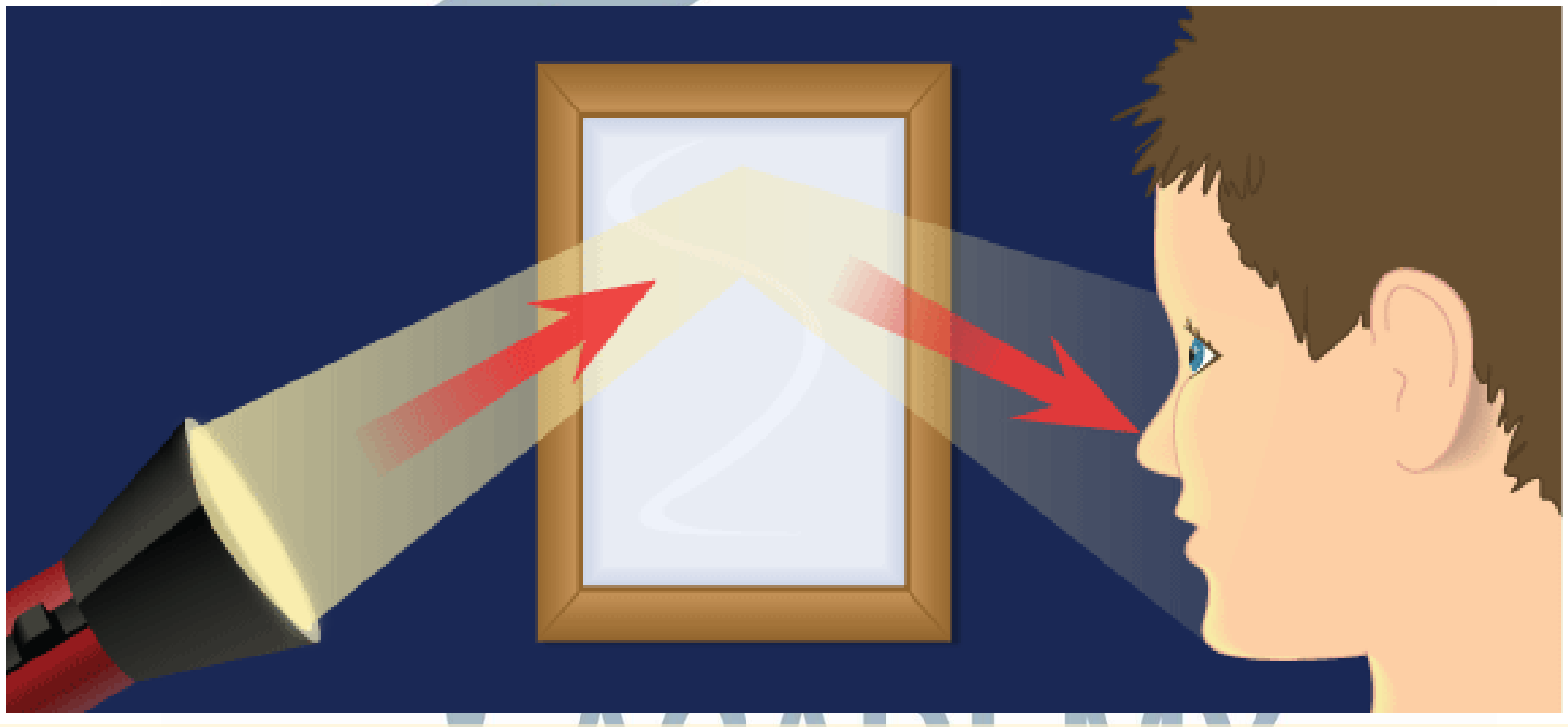
Physics – Grade 10

Unit Three – Optics



Chapter 10 – Reflection of Light

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Quiz
Time
Be Smart
ACADEMY

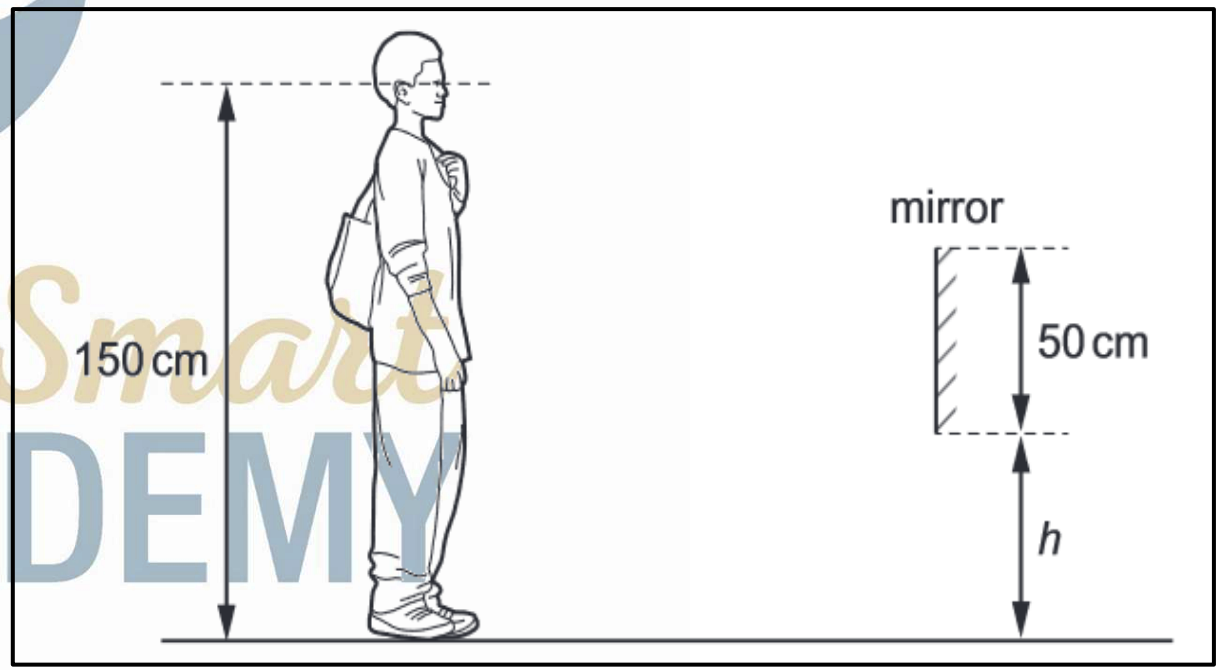
Quiz 1 reflection of light 10 min

A shoe shop puts a mirror on the wall so that customers can look at their shoes.

The length of the mirror is 50 cm. A customer has eyes 150 cm above ground level.

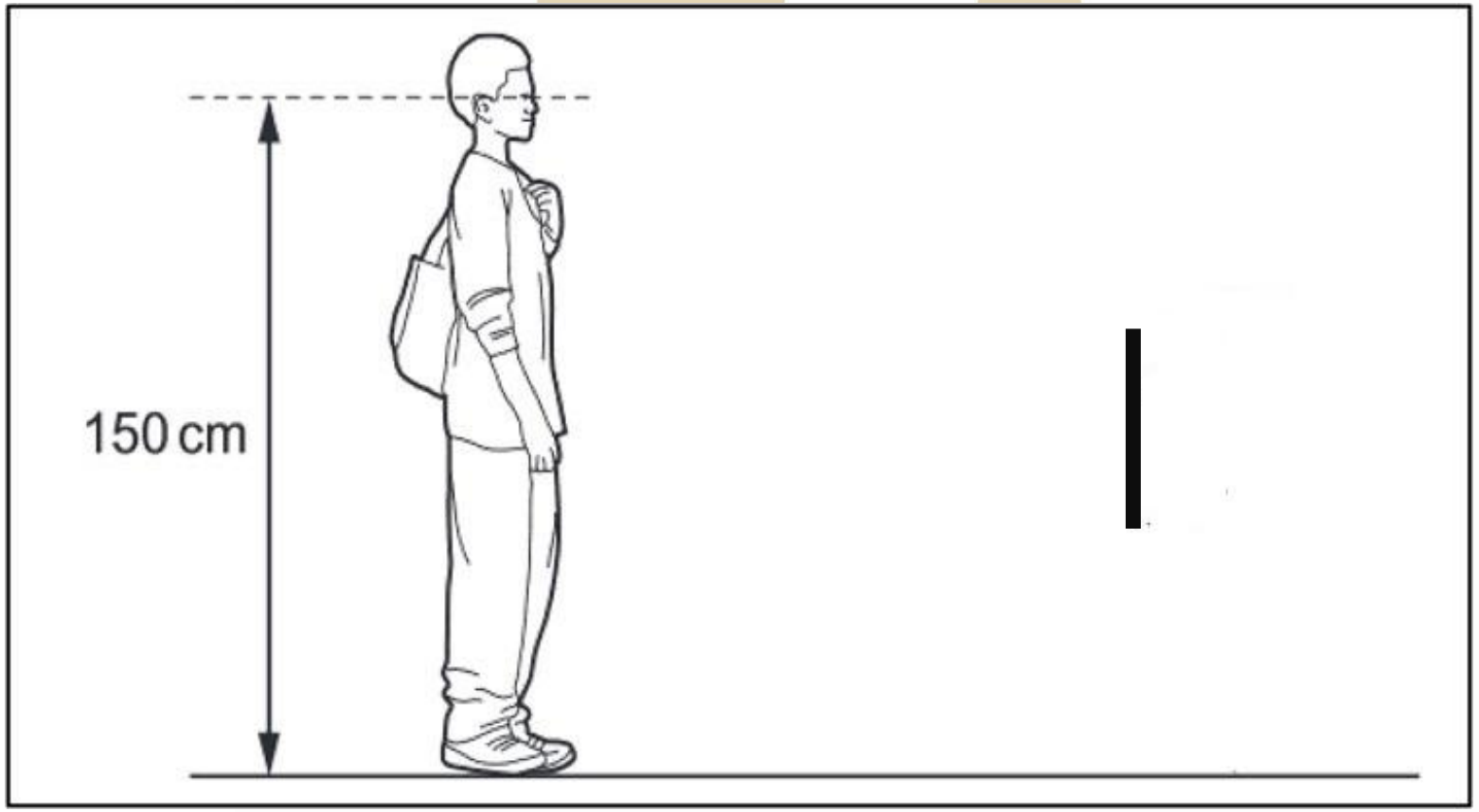
The bottom of the mirror is at height h above the ground.

What is the smallest value of h that allows the customer to see an image of his shoes in the mirror?



Quiz 1 reflection of light 10 min

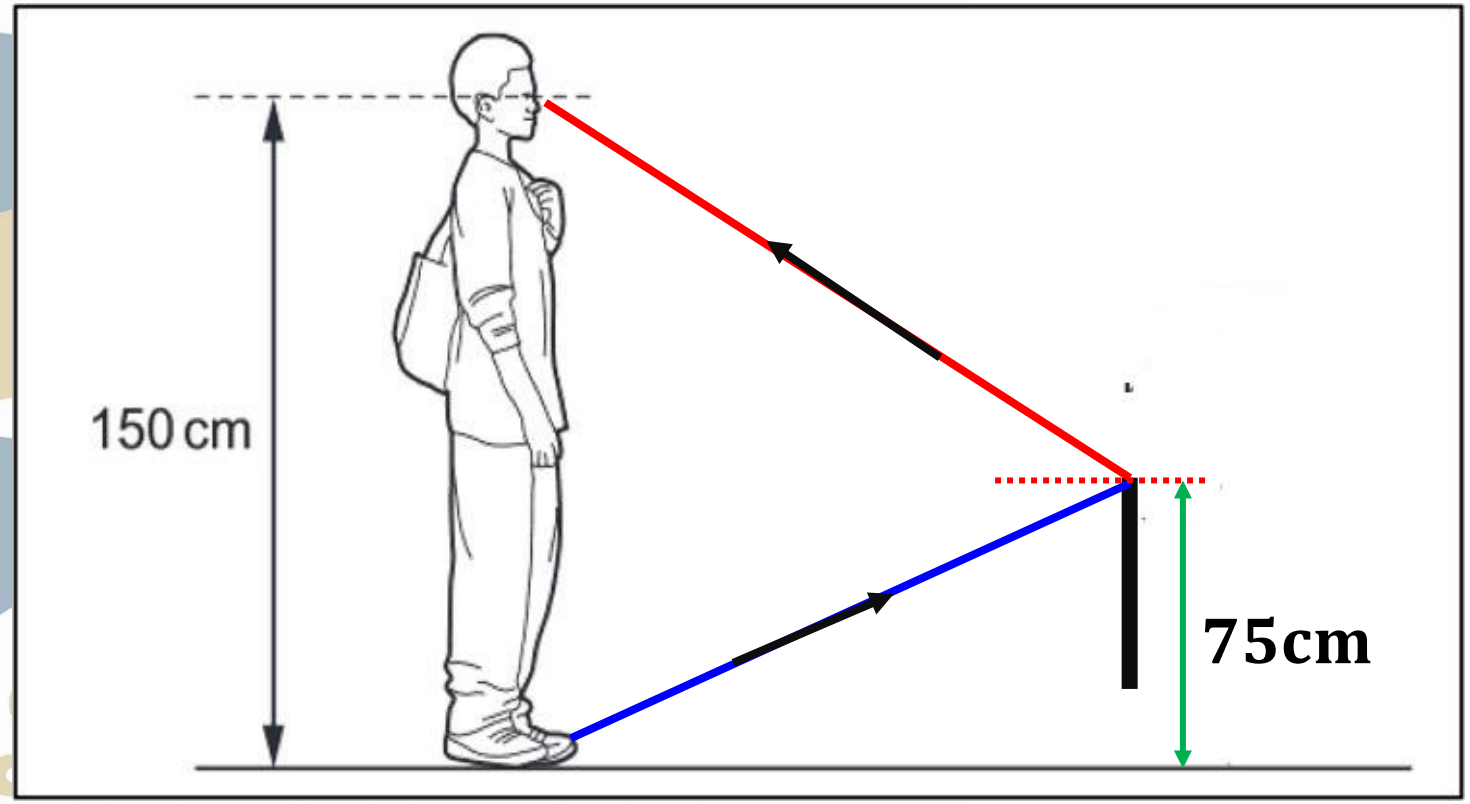
The mirror must be shifted down, such that the distance between the top of the mirror and the ground is (150cm÷2)



Quiz 1 reflection of light 10 min

The distance between the top of the mirror and the ground is 75cm

Draw a ray issued from the shoe to the top of the mirror.

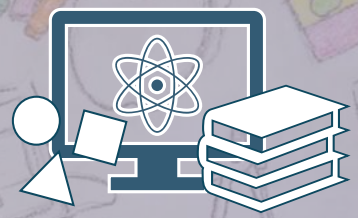


The ray reflected to the eye of the customer.

$75cm = h +$ length of mirror

$75cm = h + 50\text{cm}$ ⇒ $h = 25cm$

The End




Quiz
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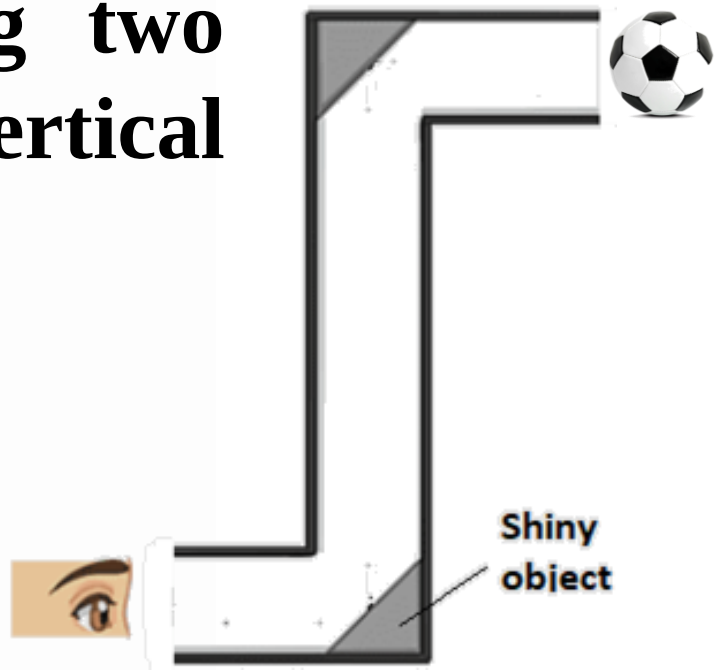
Quiz 2 image by periscope 20 min

A periscope is an optical instrument used for viewing objects that are not on the same level of direct sight.

The periscope consists of a tube holding two parallel plane mirrors separated by a vertical distance of 7.5 m



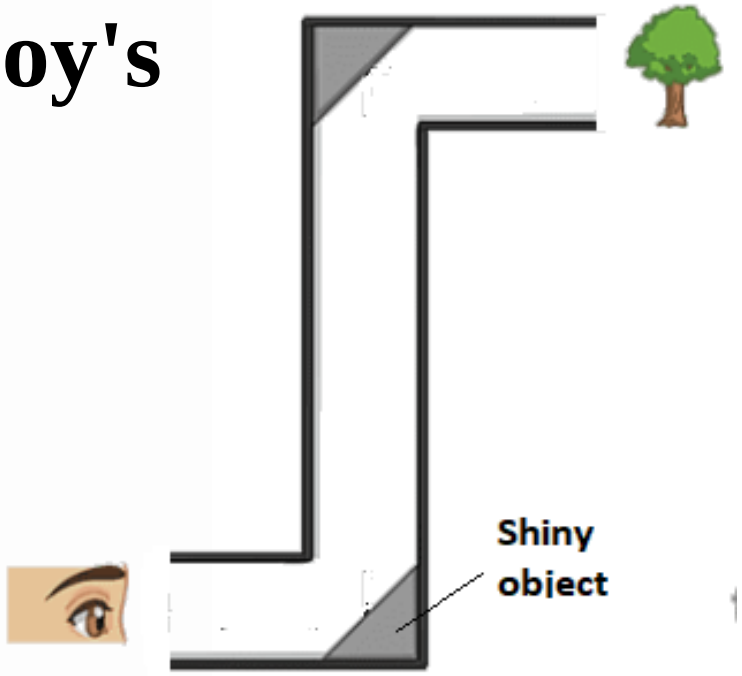
A boy is looking through the eyepiece at a ball on the other side. The ball is at a horizontal distance of 25m from the upper mirror.

The boy's eye is at a horizontal distance of 10cm from the lower mirror.

Quiz 2 image by periscope 20 min

1) Draw the ray diagram to see the ball.

2) Determine the distance between the boy's eye and the formed image of the ball.



3) Is the final image real or virtual?

4) Is it upright or inverted?

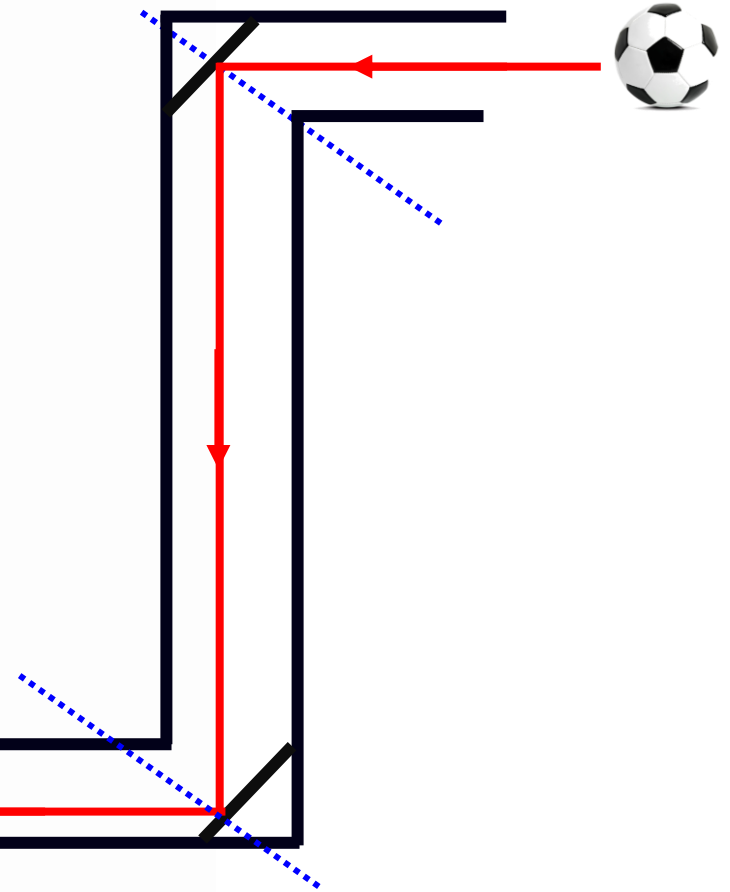
5) Does it appear to be left-right reversed?

1) Draw the ray diagram to see the tree.

A ray issued from the ball towards the upper mirror.

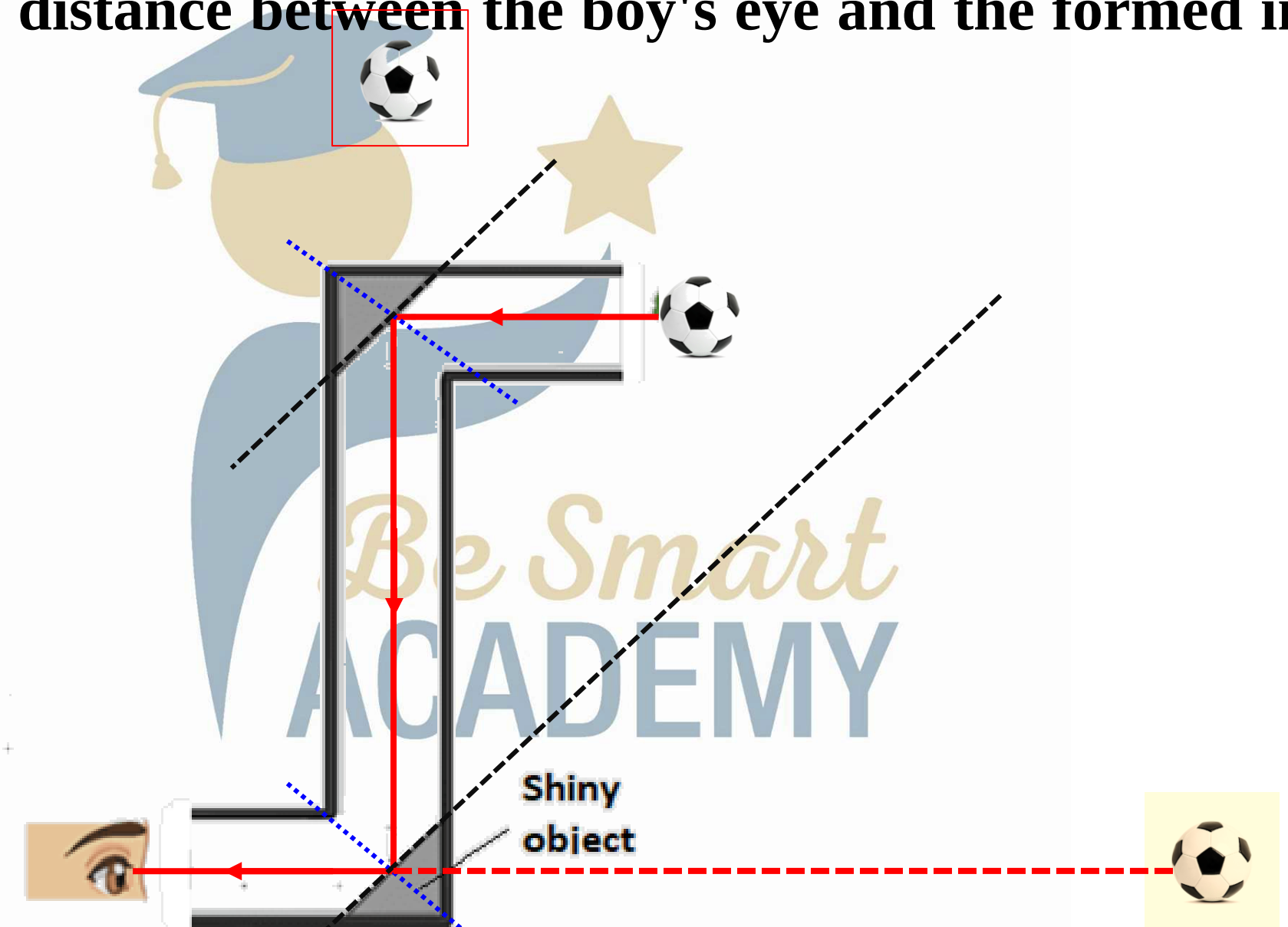
A ray is reflected by the upper mirror inside the tube of the periscope.

The new ray arrives to the lower mirror then reflected to the boy's eye.



Quiz pinhole camera 20 min

2) Determine the distance between the boy's eye and the formed image of the ball.

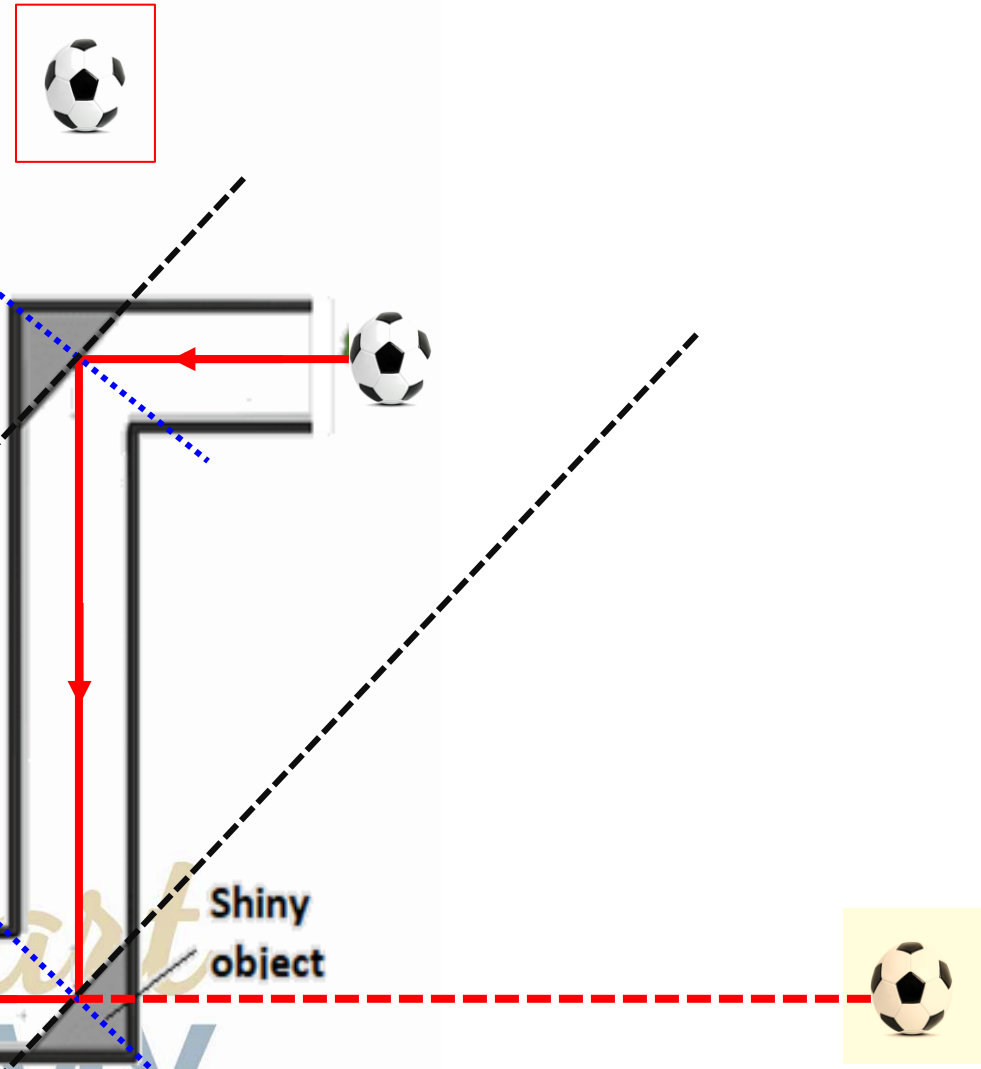


The distance between the image and the upper mirror is 25m.

The distance between the two mirrors is 7.5m.

The distance between the lower mirror and the boy's eye is 10cm.

Then the distance (eye-image) is:



$$d = 25m + 7.5m + 0.1m = 32.6m$$

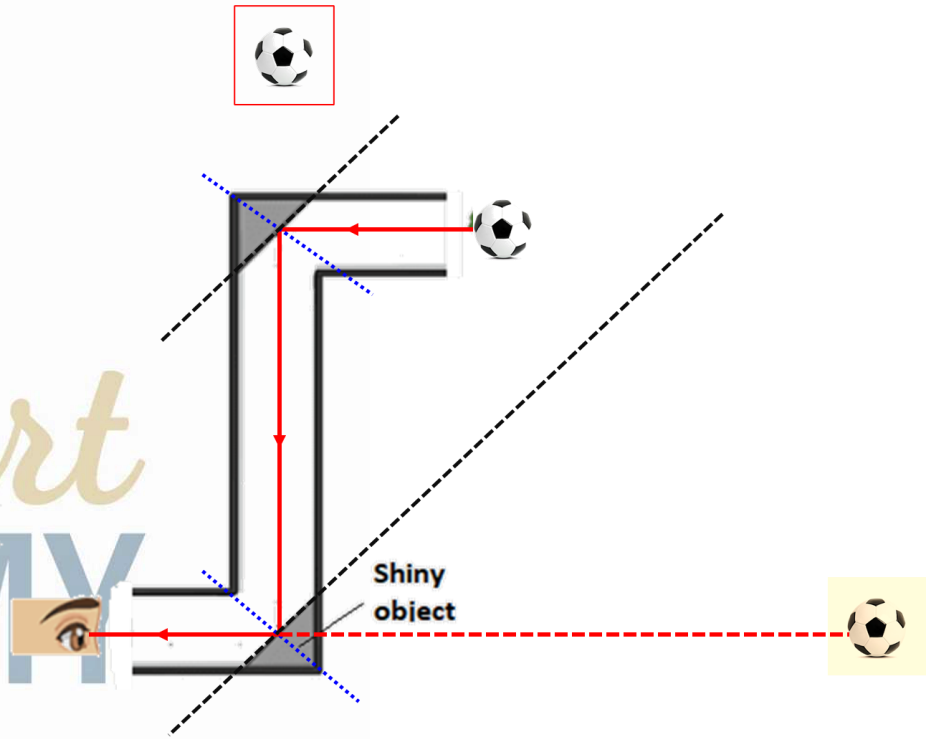
Quiz pinhole camera 20 min

3) Is the final image real or virtual?

The image formed by a mirror is always virtual, since its not really exist.

4) Is it upright or inverted?

The image is upright.



5) Does it appear to be left-right reversed?

The image formed by the upper mirror is reversed (left-right)

When the image reflected by the lower mirror it is reversed (left-right) another time

Therefore, the image returned to its initial shape

The End