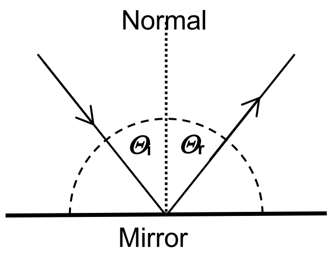
1.



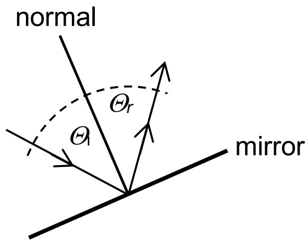
Θ_i : Angle of incidence

Θ_r : Angle of reflection

2. The angle of incidence equals the angle of reflection $\Theta_i = \Theta_r$

3. When light is incident on a rough surface, it is reflected in many directions. This is called diffuse reflection. Specular reflection occurs if a surface is very smooth, for example the surface of a flat mirror. The incident light rays are reflected according to the law of reflection as stated in 2.

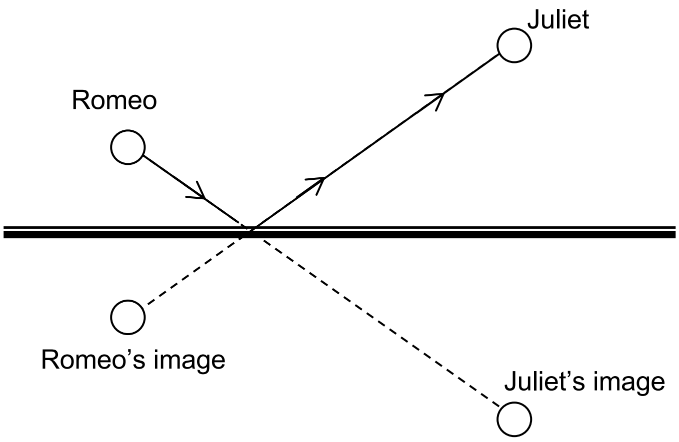
4. Construct the bisector of the incident and the reflected ray. This is the normal.
The mirror's surface lies perpendicular to the normal.



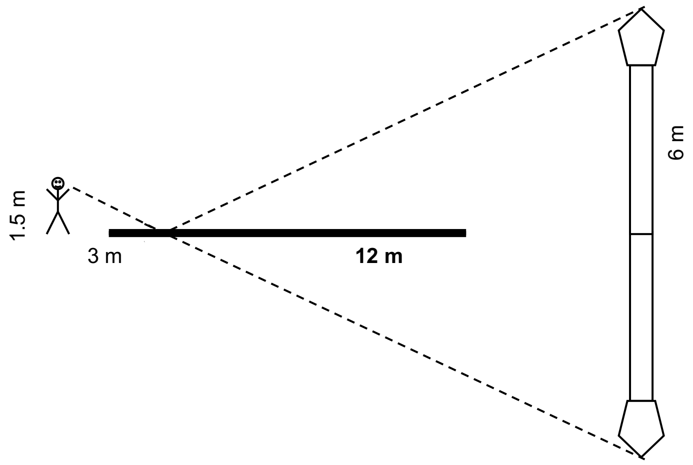
5. e) on the other side of the mirror at a distance of 1.00 m

6. It's an image which we can see, but from which actually no light rays originate. Plane mirrors, for example, create virtual images. Such a virtual image is located behind the mirror. But the light rays have merely been reflected off the mirror's surface in such a way that they seem to be coming from a point behind the mirror.

7.



8. a)



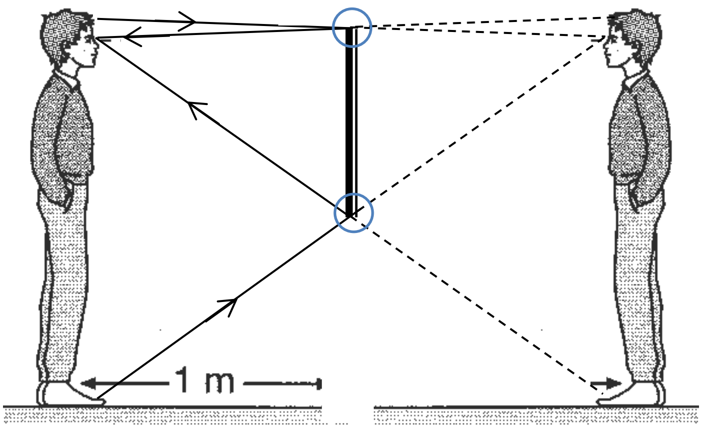
Similar triangles:

b) $\dfrac{h_{\text{girl}}}{d_{\text{girl–point of reflection}}} = \dfrac{h_{\text{tower}}}{d_{\text{tower–point of reflection}}}$

$d_{\text{tower–point of reflection}} = \dfrac{h_{\text{tower}} \cdot d_{\text{girl–point of reflection}}}{h_{\text{girl}}} = \dfrac{6.0\text{ m} \cdot 3.0\text{ m}}{1.5\text{ m}} = 12\text{ m}$

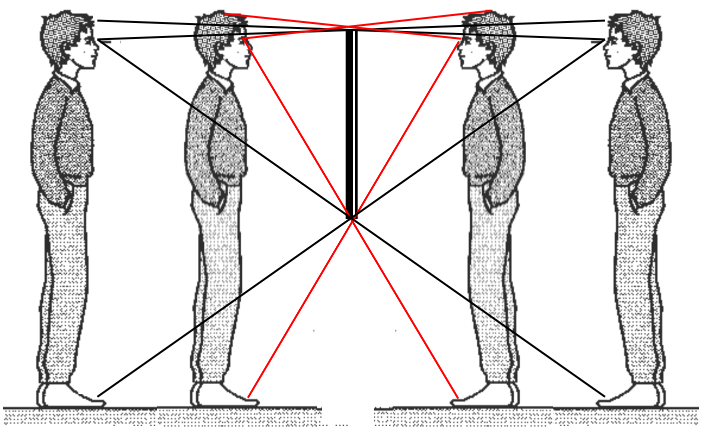
$d_{\text{girl–tower}} = d_{\text{girl–point of reflection}} + d_{\text{tower–point of reflection}} = 3.0 + 12\text{ m} = \underline{\underline{15\text{ m}}}$

9. a), b), c) and d)

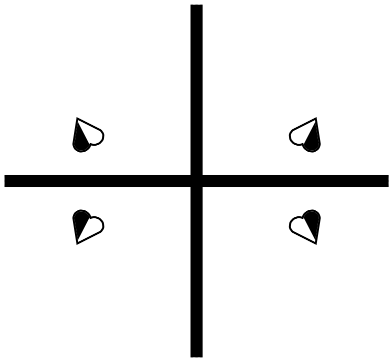


e) The mirror has to be half the size of the person, that is 80 cm.

e) Neither the size nor the position of the mirror needs to be changed.



10. a) and b)



c) The mirror image on the lower right is identical to the object (try rotation by 180 °). The other two are reversed.