

6. Life hacks (6 points) — *Jurij Bajc and Jaan Kalda.*

A normal healthy eye is able to see an object clearly if the object is located at a distance between 25.0 cm to infinity from the eye. A nearsighted eye sees equally well with the aid of a contact lens with an optical power of -6.00 dioptries.

i) (1 point) What is the clear-vision range for the nearsighted eye without the contact lens?

ii) (2 points) If a person uses glasses instead of contact lenses and the lens in the glasses is 2.00 cm from the eye, what is the adequate optical power of the lens to aid the nearsighted eye to see normally?

iii) (3 points) A front-wheel-drive car can hold steady on a sloping asphalt road with the brakes blocking all the four wheels when the road slope is no more than 45 degrees, and it can drive uphill when the road slope is no more than 22 degrees. What is the maximum slope of the road along which the car can reverse uphill? Assume that the centre of gravity of the car is equidistant from both the front and rear wheels.