Israel Open Astronomy Olympiad 2025

Junior and Senior age group problems

Stellarium problem (30 p.)

During a Solar eclipse, the Moon occults the Sun, that is, is positioned between the Sun and the observer. In the same way, the Moon may also occult a planet. For example, in the evening of January 04, 2025, an occultation of Saturn by Moon occurred.

Similarly to the Solar eclipse, the planetary occultation by the Moon is also visible just from a small fraction of the surface of the Earth.

A Set up the observer position in Netanya and the time to January 04, 2025, 21:00. The angular diameter of the Moon is 30'. Determine the distance from Saturn to the nearest point of the Moon's disk. You may use the ruler to measure the distances on the screen.

Answer: The angular distance from Saturn to the nearest edge of the Moon disk is []'. (5 p.)

B What is the numerical value of the phase of the Moon at this moment? The phase $\Phi = d/D$ is defined as illuminated diameter fraction of the Moon disk (e.g., 0.33). Read value from the Stellarium or determine yourself.

Answer: Moon phase at this moment is []. (5 p.)

C Determine the time of closest approach between the center of the Moon disk and the Saturn as seen from Netanya. How large is this distance from the **center** of the Moon disk to Saturn (express in angular minutes, ')?



D Was Saturn occulted on January 04, as seen from Netanya [yes/no]?

Answer: Select one: [Yes]/[No] (1 p.)

E If not, specify the reason. If yes, how long was the duration of the occultation as seen from Netanya (in minutes)? Specify 0 if the event did not occur.

Answer: Select one: [Occultation was observable] / [Moon's disk did not touch Saturn / Occultation occurred when Moon and Saturn were below the horizon / Occultation occurred during daytime] (1 p.)

The occultation duration, as seen from Netanya, was [] minutes. (4 p., if relevant)



F Was this occultation seen from Greenwich, London? [yes/no]

Answer: Select one: [Yes]/[No] (1 p.)

G If not, specify the reason. If yes, how long was the duration of the occultation as seen from Greenwich (in minutes)? Specify 0 if the event did not occur.

Answer: Select one: [Occultation was observable] / [Moon's disk did not touch Saturn / Occultation occurred when Moon and Saturn were below the horizon / Occultation occurred during daytime] (1p.)

The occultation duration, as seen from Greenwich, was [] minutes. (4 p., if relevant)

H Every month, Moon passes near Saturn on the sky. Check whether the Saturn occultation of the Moon may be observed from Netanya:

a) In February 2025

Answer: [Yes] / [No, Moon's disk did not touch Saturn] / [No, occultation occurred when Moon and Saturn were below the horizon] / [No, occultation occurred during daytime] (2 p.)

b) In April 2025

Answer: [Yes] / [No, Moon's disk did not touch Saturn] / [No, occultation occurred when Moon and Saturn were below the horizon] / [No, occultation occurred during daytime] (2 p.)

c) In August 2024

Answer: [Yes] / [No, Moon's disk did not touch Saturn] / [No, occultation occurred when Moon and Saturn were below the horizon] / [No, occultation occurred during daytime] (2 p.)