

Zaporedje posnetkov Zemlje je naredila vesoljska sonda, ki se je gibala okoli Lune po kožni orbiti. Oцени višino sonde nad površjem Lune, če veš, da je med zaporednima posnetkoma minilo 8 sekund. Predpostavi, da je masa Lune 81-krat manjša od mase Zemlje, polmer Lune pa 4-krat manjši od Zemljinega.

Rešitve:

Sonda kroži 100 kilometrov nad površjem Lune.

1. Naviderni premer Zemlje iz Lune: $1^{\circ} 50'$
2. Med prvó in sadijo fotografijo je minilo 40s. Zemlja se je premaknila za $1^{\circ} 50'$.

$$\begin{array}{l} 40s \dots\dots 1^{\circ} 50' \\ 131\text{min} \times \dots\dots 360^{\circ} \end{array}$$

Sonda kroži Luno v 131 minutah.

3. Slep o višini sonde z uporabo podatkov o ISS in predpostavbam, da je gravitacija na Luni $1,6 \frac{m}{s^2}$.

$$:6 \left(\begin{array}{l} 10 \frac{m}{s^2} \dots\dots 90\text{min} \\ 1,6 \frac{m}{s^2} \dots\dots 540\text{min} \end{array} \right) :6$$

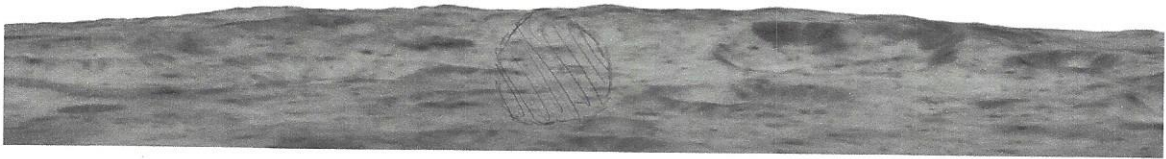
$$:4 \left(\begin{array}{l} 6800\text{km} \dots\dots 540\text{min} \\ x\text{km} \dots\dots 131\text{min} \end{array} \right) :4$$

$$\underline{x = 1700\text{km}} = \text{oddaljenost od središča Lune.}$$

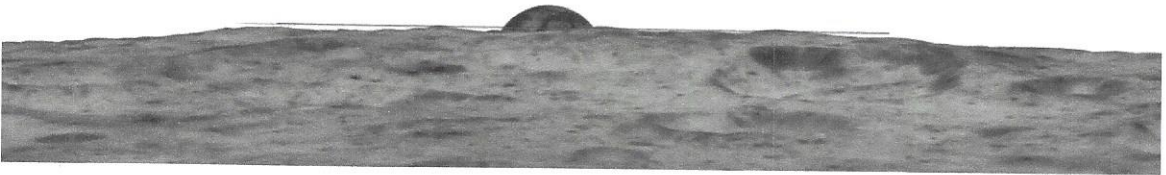
4. Višina sonde nad površjem Lune.

Višina krožnje od središča Lune - polmer Lune.

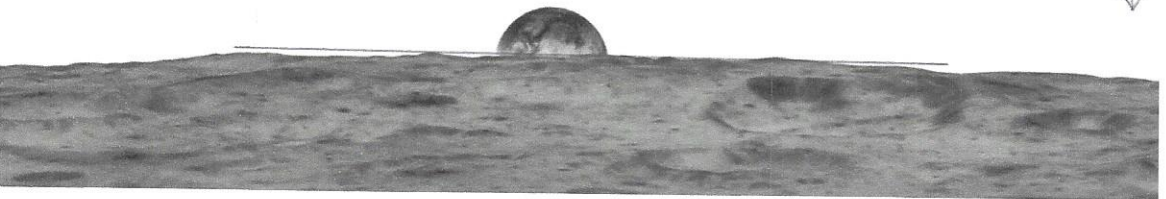
$$1700\text{km} - 1600\text{km} = 100\text{km}$$



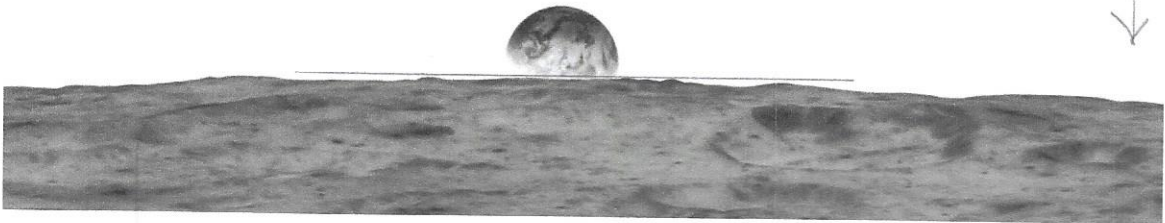
↓ 8.15



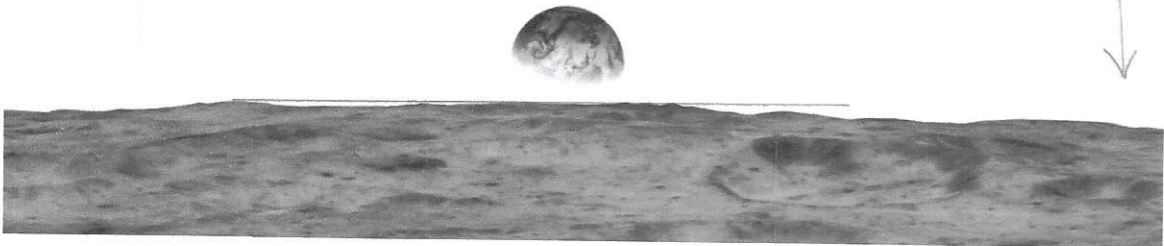
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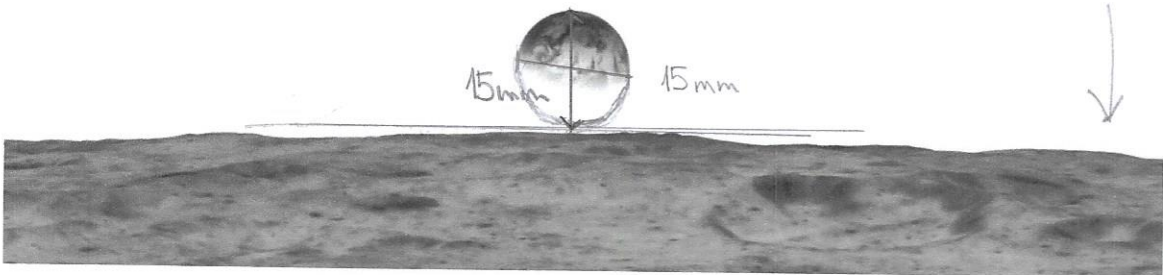
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↓



↓



1.

$$r_{\text{Z}} = 6400 \text{ km}$$

$$r_{\text{Z-L}} = 400\,000 \text{ km}$$

$$\frac{6400 \text{ km}}{2\pi \cdot 400\,000 \text{ km}} = \frac{x^\circ}{360^\circ}$$

$$2\pi \cdot 400\,000 \text{ km} =$$

$$\frac{6400 \cdot 360 \cdot 32 \cdot 16 \cdot 8 \cdot 4}{2\,520\,000 \cdot 1260 \cdot 630 \cdot 315 \cdot 35} = \frac{32}{35}$$

$$32 : 35 = 0,91 = 0,9$$

$$\begin{array}{r} 320 \\ 05 \\ \hline 50 \end{array}$$

$$100\% \dots \dots 60'$$

$$90\% \dots \dots 54'$$

Polmer Zemljinega π idealnega premera iz Lune je $54'$.

$$\text{Premer je } 1^\circ 48' \doteq 1^\circ 50'$$

→ Na sibi

$$15 \text{ mm} \dots \dots 1^\circ 50'$$



$$\begin{array}{r} 2\,400\,000 \\ + 120\,000 \\ \hline 2\,520\,000 \text{ km} \end{array}$$

$$\frac{315 \cdot 9}{45} = 35$$

2. Pretebli čas od prve do zadnje fotografije: 40₁₈
 Premik zemlje na obzorju: 1° 50'

$$\begin{array}{r}
 40_{18} \quad \dots \quad 110' \\
 60_{18} \quad \dots \quad x = 165' = 2^{\circ} 45' \\
 \hline
 \end{array}
 \quad
 \frac{60 \cdot 110 \cdot 3:55}{45 \cdot 2 \cdot 1} = 165'$$

$$\begin{array}{r}
 165 \\
 - 120 \\
 \hline
 45' \\
 \\
 \frac{360 \cdot 60}{21600'}
 \end{array}$$

1 min 165' = 2,75°

131 min = x min 360° = 21600'

$$\frac{21600 \cdot 4320 \cdot 1440}{165 \cdot 38 \cdot 11} = \frac{1440}{11} = 131 \text{ min}$$

Londa obhiti Luno v 131 minutah.

$$\begin{array}{r}
 1440 : 11 = 131 \\
 34 \\
 10
 \end{array}$$

$$\begin{array}{r}
 21600 : 5 = 4320 \\
 16 \\
 10 \\
 00
 \end{array}$$

$$\begin{array}{r}
 4320 : 3 = 1440 \\
 13 \\
 12
 \end{array}$$

3 ISS:

$$t_0 = 90 \text{ min}$$

Uštrva od središća Zemlje: 6800 km $g = 10 \frac{\text{m}}{\text{s}^2}$

(6400 km + 400 km)

Gravitacija na Luni je $1,6 \frac{\text{m}}{\text{s}^2}$

Obilazni čas: 90 min

Gravitacija na Zemlji: $10 \frac{\text{m}}{\text{s}^2}$

Gravitacija na Luni: $1,6 \frac{\text{m}}{\text{s}^2}$

$$\begin{array}{l} 10 \frac{\text{m}}{\text{s}^2} \dots \dots 90 \text{ min} \\ \swarrow \quad \searrow \\ 1,6 \frac{\text{m}}{\text{s}^2} \dots \dots 540 \text{ min} \end{array} \cdot 6$$

$$\begin{array}{l} 6800 \text{ km} \dots \dots 540 \text{ min} \\ \swarrow \quad \searrow \\ x \text{ km} \dots \dots 131 \text{ min} \end{array} \cdot 4$$

$$x = \underline{\underline{1700 \text{ km}}}$$

$$\frac{540}{4} = 135$$

$$\frac{14}{20}$$

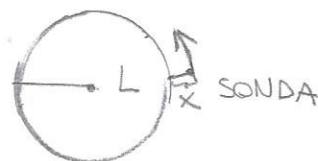
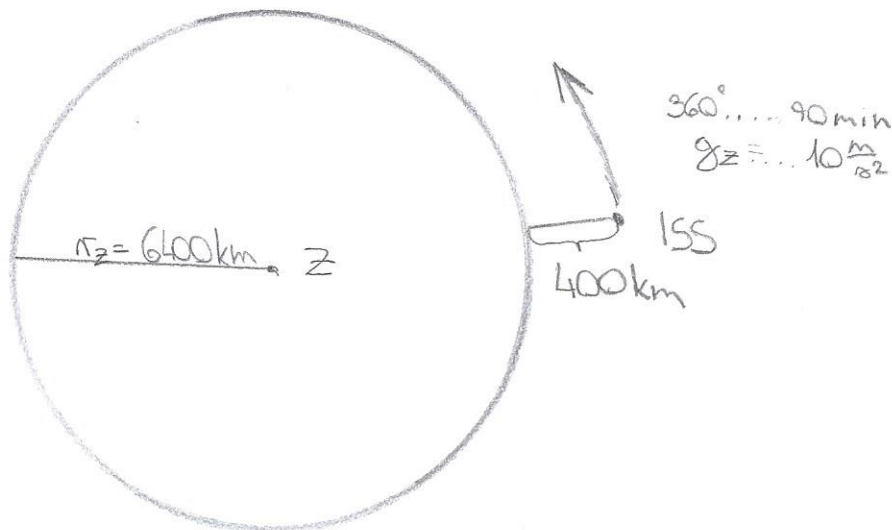
$$\frac{6800 \text{ km}}{28} \cdot 4 = \underline{\underline{1700 \text{ km}}}$$

$S_Z =$ Središće Zemlje

$S_L =$ Središće Lune

$$d(\text{ISS}, S_Z) = 6800 \text{ km}$$

$$d(\text{Sonda}, S_L) = 1700 \text{ km}$$



$$r_L = \frac{r_Z}{4} = \frac{6400 \text{ km}}{4} = 1600 \text{ km}$$

$$360^\circ \dots \dots 131 \text{ min}$$

$$g_L \dots \dots 1,6 \frac{\text{m}}{\text{s}^2}$$

4. Vášna sonde rad površjem: $d(\text{Sonde}, S_L) - r_L =$

$$1700 \text{ km} - 1600 \text{ km} = \boxed{100 \text{ km}}$$