Calculating Illuminance and Luminous Intensity

Enter the luminous intensity of the luminous source, the distance, and the angle between the perpendicular line and light ray, to find the illuminance of the illuminated side. Conversely, find the luminous intensity of the source from the illuminance of the illuminated side.

**Calculation**

\[
i = \frac{l \cdot \cos \theta}{r^2} \quad l = r^2 \cdot \frac{i}{\cos \theta}
\]

- **i**: illuminance [lux]
- **l**: luminous intensity [candela]
- **r**: distance [m]
- **θ**: angle [°]

**Programme List (REAL MODE)**

- **Title**: CAND LUX
- **Deg**
- **Label**: START
- **ClrT**
- **Print**: "CANDELA=1 LUX=2 SELECT 1 or 2"
- **Input**: S
- **If S=1 Goto**: CANDELA
- **If S=2 Goto**: LUX
- **Goto**: START

**CANDELA**

- **Gosub**: DISTANCE
- **Print**: "Input LUX"
- **Input**: L
- **R = l \cdot \cos \theta \Rightarrow C**
- **Print**: "CANDELA"
- **Print**: C
- **End**

**LUX**

- **Gosub**: DISTANCE
- **Print**: "Input CANDELA"
- **Input**: C
- **C = K**
- **K = \frac{\cos \theta \cdot R^2}{L}**
- **Print**: "LUX"
- **Print**: L
- **End**

**DISTANCE**

- **Print**: "Input DISTANCE"
- **Input**: D
- **R = D**
- **Print**: "Input ANGLE"
- **Input**: A
- **A = \theta**
- **Return**

**Parameters**

<table>
<thead>
<tr>
<th>Name of parameter</th>
<th>Content</th>
<th>Name of parameter</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>illuminance of illuminated side</td>
<td>θ</td>
<td>angle</td>
</tr>
<tr>
<td>K</td>
<td>luminous intensity of luminous source</td>
<td>A</td>
<td>input of angle</td>
</tr>
<tr>
<td>R</td>
<td>distance</td>
<td>L</td>
<td>input and calculating luminous intensity</td>
</tr>
<tr>
<td>S</td>
<td>selecting calculation type (S=1: calculation of luminous intensity) (S=2: calculation of illuminance)</td>
<td>D</td>
<td>input of distance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>input and calculating illuminance</td>
</tr>
</tbody>
</table>
**Exercise**

1. Find the luminous intensity of the luminous source of distance 10m, angle 60° and illuminance 20 lux.
2. Find the illuminance of the illuminated side of distance 10m, angle 60° and luminous intensity 4000 candela.

Set up condition: decimal point in Float Pt Mode.

### Step | Key Operation | Display
--- | --- | ---
1. Specify the programme mode. Select the title CAND LUX. | PRGM A | CANCEL=

2. Select calculation of luminous intensity. | 1 ENTER | CANCEL=

3. Enter the values of distance, angle, and illuminance. | 1 0 ENTER 6 0 ENTER 2 0 ENTER | CANCEL=

(Display of luminous intensity)

4. Select calculation of illuminance. Enter the values of distance, angle, and luminous intensity. | ENTER 2 ENTER 1 0 ENTER 6 0 ENTER 4 0 0 0 ENTER | Input ANGLE 60 Input LUX 4000 Lux 20