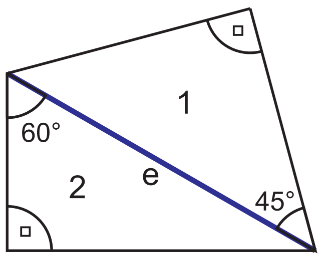
Drücke den Umfang “u” und die Fläche “A” durch die Diagonale “e” aus.

Beispiel a)



Nötige Formeln

Quadrat: $u = 4*a$

$$A_\square = a_\square^2$$

$$d = a*\sqrt{2} \quad \text{daraus} \quad a_\square = \frac{d}{\sqrt{2}}$$

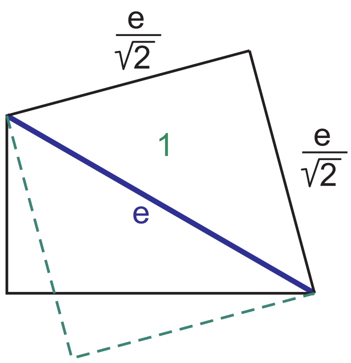
Gleichseitiges Dreieck (60°)

$$u = 3*a_\triangle$$

$$A_\triangle = \frac{a_\triangle^2 * \sqrt{3}}{4}$$

$$h = \frac{a_\triangle}{2}\sqrt{3} \quad \text{daraus}$$

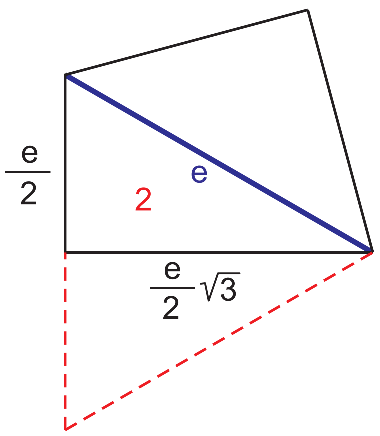
$$a_\triangle = \frac{2h}{\sqrt{3}}$$



Die Fläche “1” ist die Hälfte eines Quadrates mit der Diagonale “e”.

$$A_1 = \frac{\frac{e}{\sqrt{2}} * \frac{e}{\sqrt{2}}}{2} = \frac{\frac{e^2}{2}}{2} = \frac{e^2}{4}$$

$$u_1 = 2 * \frac{e}{\sqrt{2}} = e\sqrt{2}$$



Die Fläche “2” ist die Hälfte eines gleichseitigen Dreiecks mit der Seite “e”.

$$A_2 = \frac{e^2 * \sqrt{3}}{8}$$

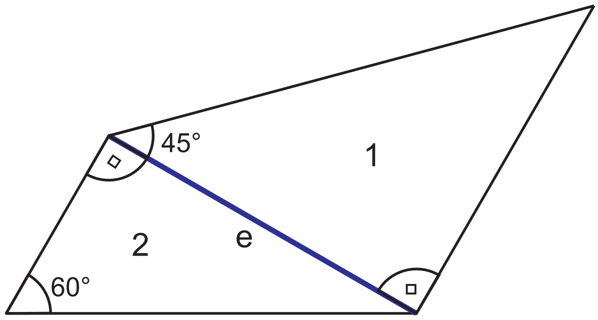
$$u_2 = \frac{e}{2} + \frac{e * \sqrt{3}}{2}$$

$$A_{ges} = A_1 + A_2 = \frac{e^2}{4} + \frac{e^2\sqrt{3}}{8} = \frac{2e^2 + e^2\sqrt{3}}{8} = \frac{e^2(2+\sqrt{3})}{8} = \mathbf{e^2 \frac{2+\sqrt{3}}{8}}$$

$$u_{ges} = u_1 + u_2 = e\sqrt{2} + \frac{e}{2} + \frac{e\sqrt{3}}{2} = \frac{2e\sqrt{2}}{2} + \frac{e}{2} + \frac{e\sqrt{3}}{2} = \frac{e(2\sqrt{2}+1+\sqrt{3})}{2} = \mathbf{e\,\frac{2\sqrt{2}+1+\sqrt{3}}{2}}$$

Drücke den Umfang “u” und die Fläche “A” durch die Diagonale “e” aus.

Beispiel b)



Nötige Formeln

Quadrat: $u = 4 * a$

$A_{\square} = a^2$

$d_{\square} = a_{\square} * \sqrt{2}$

daraus $a_{\square} = \dfrac{d}{\sqrt{2}}$

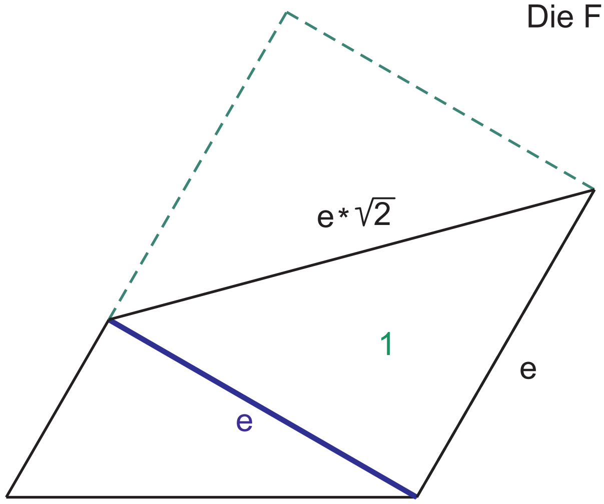
Gleichseitiges Dreieck (60°)

$u = 3 * a_{\triangle}$

$A = \dfrac{a_{\triangle}^2 * \sqrt{3}}{4}$

$h = \dfrac{a_{\triangle}}{2}\sqrt{3}$ daraus

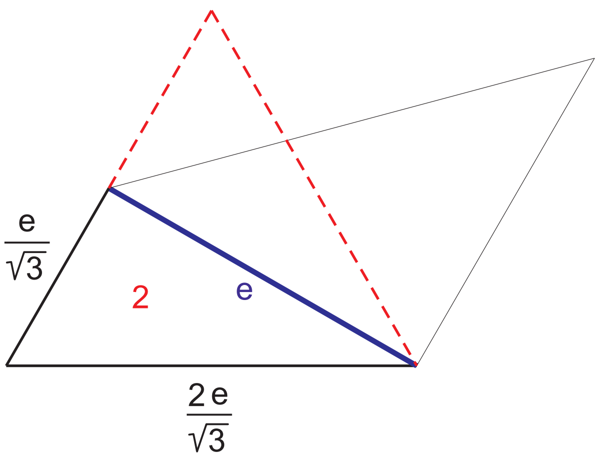
$a_{\triangle} = \dfrac{2h}{\sqrt{3}}$



Die Fläche “1” ist die Hälfte eines Quadrates mit der Seite “e”.

$$A_1 = \frac{e^2}{2}$$

$$u_1 = e + e * \sqrt{2}$$



Die Fläche “2” ist die Hälfte eines gleichseitigen Dreiecks mit der Höhe “e”.

$$a_{\triangle} = \frac{2e}{\sqrt{3}}$$

$$A_2 = \frac{a_{\triangle}^2 * \sqrt{3}}{8} = \frac{\frac{2e}{\sqrt{3}} * \frac{2e}{\sqrt{3}} * \sqrt{3}}{8} = \frac{\frac{4e^2}{3} * \sqrt{3}}{8} = \frac{e^2 * \sqrt{3}}{6}$$

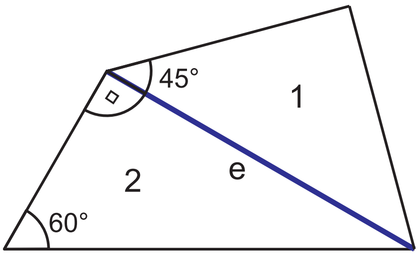
$$u_2 = \frac{e}{\sqrt{3}} + \frac{2e}{\sqrt{3}} = \frac{3e}{\sqrt{3}} = e\frac{3}{\sqrt{3}} = e\sqrt{3}$$

$$A_{ges} = A_1 + A_2 = \frac{e^2}{2} + \frac{e^2 * \sqrt{3}}{6} = \frac{3e^2}{6} + \frac{e^2 * \sqrt{3}}{6} = \frac{3e^2 + e^2 * \sqrt{3}}{6} = \frac{e^2(3+\sqrt{3})}{6} = e^2\frac{3+\sqrt{3}}{6}$$

$$u_{ges} = u_1 + u_2 = e + e * \sqrt{2} + e * \sqrt{3} = e(1 + \sqrt{2} + \sqrt{3})$$

Drücke den Umfang "u" und die Fläche "A" durch die Diagonale "e" aus.

Beispiel c)



Nötige Formeln

Quadrat: $u = 4 * a$

$A_\square = a_\square^2$

$d = a * \sqrt{2}$ daraus $a_\square = \dfrac{d}{\sqrt{2}}$

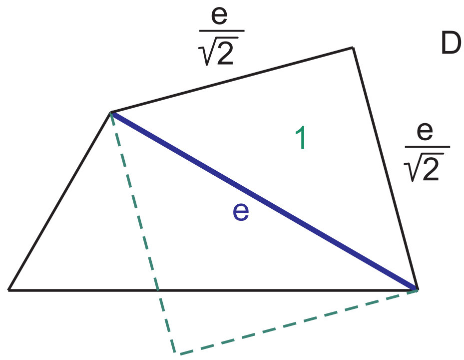
Gleichseitiges Dreieck (60°)

$u = 3 * a_\triangle$

$A = \dfrac{a_\triangle^2 * \sqrt{3}}{4}$

$h = \dfrac{a_\triangle}{2}\sqrt{3}$ daraus

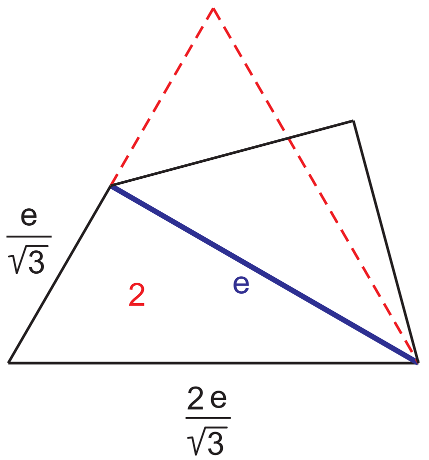
$a_\triangle = \dfrac{2h}{\sqrt{3}}$



Die Fläche "1" ist die Hälfte eines Quadrates mit der Diagonale "e".

$$A_1 = \frac{\frac{e}{\sqrt{2}} * \frac{e}{\sqrt{2}}}{2} = \frac{\frac{e^2}{2}}{2} = \frac{e^2}{4}$$

$$u_1 = 2 * \frac{e}{\sqrt{2}} = e\sqrt{2}$$



Die Fläche "2" ist die Hälfte eines gleichseitigen Dreiecks mit der Höhe "e".

$$a_\triangle = \frac{2e}{\sqrt{3}}$$

$$A_2 = \frac{a_\triangle^2 * \sqrt{3}}{8} = \frac{\frac{2e}{\sqrt{3}} * \frac{2e}{\sqrt{3}} * \sqrt{3}}{8} = \frac{\frac{4e^2}{3} * \sqrt{3}}{8} = \frac{e^2 * \sqrt{3}}{6}$$

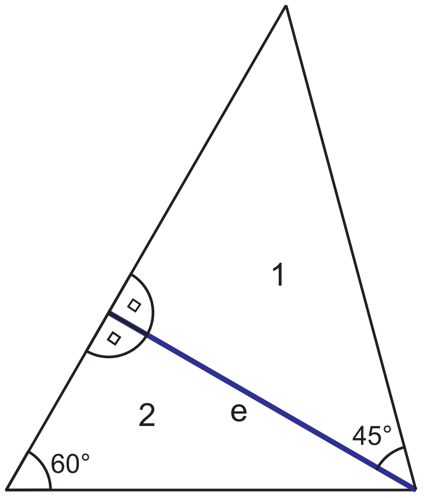
$$u_2 = \frac{e}{\sqrt{3}} + \frac{2e}{\sqrt{3}} = \frac{3e}{\sqrt{3}} = e\frac{3}{\sqrt{3}} = e\sqrt{3}$$

$$A_{ges} = A_1 + A_2 = \frac{e^2}{4} + \frac{e^2\sqrt{3}}{6} = \frac{3e^2 + 2e^2\sqrt{3}}{12} = \frac{e^2(3 + 2\sqrt{3})}{12} = \mathbf{e^2 \frac{3 + 2\sqrt{3}}{12}}$$

$$u_{ges} = u_1 + u_2 = e\sqrt{2} + e\sqrt{3} = \mathbf{e(\sqrt{2} + \sqrt{3})}$$

Drücke den Umfang “u” und die Fläche “A” durch die Diagonale “e” aus.

Beispiel d)



Nötige Formeln

Quadrat: $u = 4 * a$

$A_\square = a^2$

$d_\square = a_\square * \sqrt{2}$

daraus $a_\square = \dfrac{d}{\sqrt{2}}$

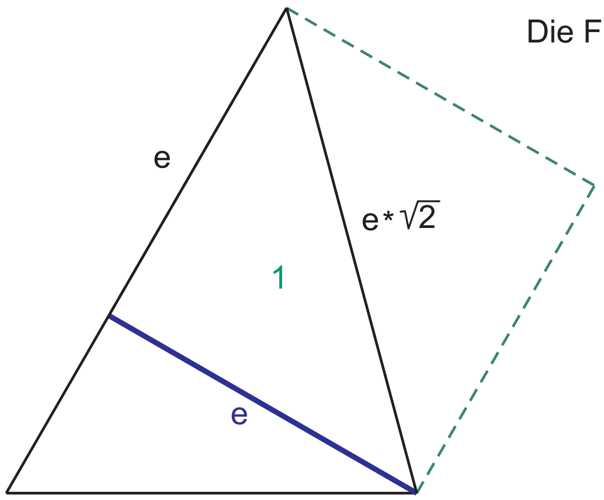
Gleichseitiges Dreieck (60°)

$u = 3 * a_\triangle$

$A = \dfrac{a_\triangle^2 * \sqrt{3}}{4}$

$h = \dfrac{a_\triangle}{2}\sqrt{3}$ daraus

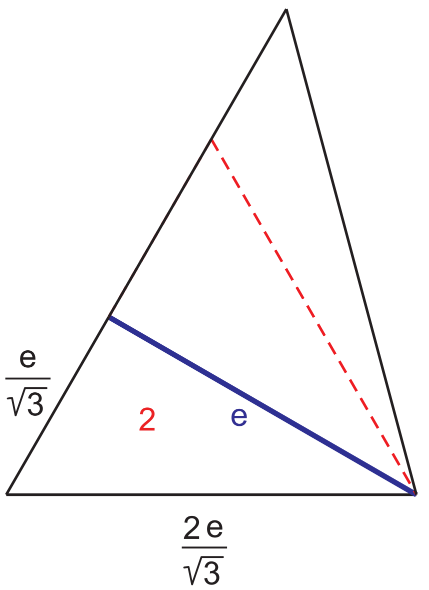
$a_\triangle = \dfrac{2h}{\sqrt{3}}$



Die Fläche “1” ist die Hälfte eines Quadrates mit der Seite “e”.

$$A_1 = \frac{e^2}{2}$$

$$u_1 = e + e * \sqrt{2}$$



Die Fläche “2” ist die Hälfte eines gleichseitigen Dreiecks mit der Höhe “e”.

$$a_\triangle = \frac{2e}{\sqrt{3}}$$

$$A_2 = \frac{a_\triangle^2 * \sqrt{3}}{8} = \frac{\frac{2e}{\sqrt{3}} * \frac{2e}{\sqrt{3}} * \sqrt{3}}{8} = \frac{\frac{4e^2}{3} * \sqrt{3}}{8} = \frac{e^2 * \sqrt{3}}{6}$$

$$u_2 = \frac{e}{\sqrt{3}} + \frac{2e}{\sqrt{3}} = \frac{3e}{\sqrt{3}} = e\,\frac{3}{\sqrt{3}} = e\sqrt{3}$$

$$A_{ges} = A_1 + A_2 = \frac{e^2}{2} + \frac{e^2 * \sqrt{3}}{6} = \frac{3e^2}{6} + \frac{e^2 * \sqrt{3}}{6} = \frac{3e^2 + e^2 * \sqrt{3}}{6} = \frac{e^2(3+\sqrt{3})}{6} = e^2\,\frac{3+\sqrt{3}}{6}$$

$$u_{ges} = u_1 + u_2 = e + e * \sqrt{2} + e * \sqrt{3} = \mathbf{e(1 + \sqrt{2} + \sqrt{3})}$$