In[71]:= **NSolve** $\left[\left\{\text{Area1 d1} == \text{Area2 d2, Area1} == \text{Entry1, d1} == \frac{2}{3}\sqrt{\frac{\text{Area1}}{\sqrt{3}}}\right.\right.$,

$\left.\text{Area2} == \sqrt{3}\ \left(\text{f2}^2 - \text{f1}^2\right), \text{d2} == \frac{2\ \left(\text{f1}^2 + \text{f1 f2} + \text{f2}^2\right)}{3\ \left(\text{f1} + \text{f2}\right)}, \text{Area2} == \text{Entry2, f1} > 0, \text{f2} > 0\right\}$ /.

$\left.\left\{\text{Entry1} \rightarrow 32/63, \text{Entry2} \rightarrow 16/63\right\}, \{\text{Area1, d1, Area2, d2, f1, f2}\}, \text{Reals}\right]$

Out[71]= $\{\{\text{Area1} \rightarrow 0.507937, \text{d1} \rightarrow 0.361022,$
$\text{Area2} \rightarrow 0.253968, \text{d2} \rightarrow 0.722043, \text{f1} \rightarrow 0.669994, \text{f2} \rightarrow 0.7717\}\}$

In[72]:= **NSolve** $\left[\left\{\text{Area1 d1} == \text{Area2 d2, Area1} == \text{Entry1, d1} == \frac{2}{3}\sqrt{\frac{\text{Area1}}{\sqrt{3}}}\right.\right.$,

$\left.\text{Area2} == \sqrt{3}\ \left(\text{f2}^2 - \text{f1}^2\right), \text{d2} == \frac{2\ \left(\text{f1}^2 + \text{f1 f2} + \text{f2}^2\right)}{3\ \left(\text{f1} + \text{f2}\right)}, \text{Area2} == \text{Entry2, f1} > 0, \text{f2} > 0\right\}$ /.

$\left.\left\{\text{Entry1} \rightarrow 8/63, \text{Entry2} \rightarrow 4/63\right\}, \{\text{Area1, d1, Area2, d2, f1, f2}\}, \text{Reals}\right]$

Out[72]= $\{\{\text{Area1} \rightarrow 0.126984, \text{d1} \rightarrow 0.180511,$
$\text{Area2} \rightarrow 0.0634921, \text{d2} \rightarrow 0.361022, \text{f1} \rightarrow 0.334997, \text{f2} \rightarrow 0.38585\}\}$

In[73]:= **NSolve** $\left[\left\{\text{Area1 d1} == \text{Area2 d2, Area1} == \text{Entry1, d1} == \frac{2}{3}\sqrt{\frac{\text{Area1}}{\sqrt{3}}}\right.\right.$,

$\left.\text{Area2} == \sqrt{3}\ \left(\text{f2}^2 - \text{f1}^2\right), \text{d2} == \frac{2\ \left(\text{f1}^2 + \text{f1 f2} + \text{f2}^2\right)}{3\ \left(\text{f1} + \text{f2}\right)}, \text{Area2} == \text{Entry2, f1} > 0, \text{f2} > 0\right\}$ /.

$\left.\left\{\text{Entry1} \rightarrow 2/63, \text{Entry2} \rightarrow 1/63\right\}, \{\text{Area1, d1, Area2, d2, f1, f2}\}, \text{Reals}\right]$

Out[73]= $\{\{\text{Area1} \rightarrow 0.031746, \text{d1} \rightarrow 0.0902554,$
$\text{Area2} \rightarrow 0.015873, \text{d2} \rightarrow 0.180511, \text{f1} \rightarrow 0.167499, \text{f2} \rightarrow 0.192925\}\}$

In[99]:= **NSolve** $\left[\left\{\text{Area1 d1} == \text{Area2 d2, Area1} == \text{Entry1, d1} == \frac{2}{3}\sqrt{\frac{\text{Area1}}{\sqrt{3}}}, \text{Area2} == \sqrt{3}\ \left(\text{f2}^2 - \text{f1}^2\right),\right.\right.$

$\left.\text{d2} == \frac{2\ \left(\text{f1}^2 + \text{f1 f2} + \text{f2}^2\right)}{3\ \left(\text{f1} + \text{f2}\right)}, \text{Area2} == \text{Entry2, f1} > 0, \text{f2} > 0, \text{Area1} == \sqrt{3}\ \text{h}^2, \text{h} > 0\right\}$ /.

$\left.\left\{\text{Entry1} \rightarrow 32/63, \text{Entry2} \rightarrow 16/63\right\}, \{\text{Area1, d1, Area2, d2, f1, f2, h}\}, \text{Reals}\right]$

Out[99]= $\{\{\text{Area1} \rightarrow 0.507937, \text{d1} \rightarrow 0.361022, \text{Area2} \rightarrow 0.253968,$
$\text{d2} \rightarrow 0.722043, \text{f1} \rightarrow 0.669994, \text{f2} \rightarrow 0.7717, \text{h} \rightarrow 0.541532\}\}$

In[100]:= **MaxF2 = 0.7717001812857543`**

Out[100]= 0.7717

In[103]:= $\texttt{NSolve}\Big[\Big\{\texttt{Area1 d1} == \texttt{Area2 d2}, \texttt{Area1} == \sqrt{3}\ \big(-\texttt{e1}^2 + \texttt{e2}^2\big), \texttt{d1} == \dfrac{2\ \big(\texttt{e1}^2 + \texttt{e1 e2} + \texttt{e2}^2\big)}{3\ \big(\texttt{e1} + \texttt{e2}\big)},$

$\texttt{Area1} == \texttt{Entry1}, \texttt{e1} > 0, \texttt{e2} > 0, \texttt{Area2} == \sqrt{3}\ \big(\texttt{f2}^2 - \texttt{f1}^2\big), \texttt{d2} == \dfrac{2\ \big(\texttt{f1}^2 + \texttt{f1 f2} + \texttt{f2}^2\big)}{3\ \big(\texttt{f1} + \texttt{f2}\big)},$

$\texttt{Area2} == \texttt{Entry2}, \texttt{f1} > 0, \texttt{f2} > 0, \texttt{f2} == \texttt{MaxF2}\Big\} \mathbin{/.} \big\{\texttt{Entry1} \rightarrow 8\big/63, \texttt{Entry2} \rightarrow 4\big/63\big\},$

$\big\{\texttt{Area1}, \texttt{d1}, \texttt{e1}, \texttt{e2}, \texttt{Area2}, \texttt{d2}, \texttt{f1}, \texttt{f2}\big\}, \texttt{Reals}\Big]$

Out[103]= $\{\{\texttt{Area1} \rightarrow 0.126984, \texttt{Area2} \rightarrow 0.0634921, \texttt{f2} \rightarrow 0.7717,$

$\texttt{f1} \rightarrow 0.747572, \texttt{d2} \rightarrow 0.7597, \texttt{d1} \rightarrow 0.37985, \texttt{e1} \rightarrow 0.329256, \texttt{e2} \rightarrow 0.42629\}\}$

In[104]:=

$\texttt{NSolve}\Big[\Big\{\texttt{Area1 d1} == \texttt{Area2 d2}, \texttt{Area1} == \sqrt{3}\ \big(-\texttt{e1}^2 + \texttt{e2}^2\big), \texttt{d1} == \dfrac{2\ \big(\texttt{e1}^2 + \texttt{e1 e2} + \texttt{e2}^2\big)}{3\ \big(\texttt{e1} + \texttt{e2}\big)},$

$\texttt{Area1} == \texttt{Entry1}, \texttt{e1} > 0, \texttt{e2} > 0, \texttt{Area2} == \sqrt{3}\ \big(\texttt{f2}^2 - \texttt{f1}^2\big), \texttt{d2} == \dfrac{2\ \big(\texttt{f1}^2 + \texttt{f1 f2} + \texttt{f2}^2\big)}{3\ \big(\texttt{f1} + \texttt{f2}\big)},$

$\texttt{Area2} == \texttt{Entry2}, \texttt{f1} > 0, \texttt{f2} > 0, \texttt{f2} == \texttt{MaxF2}\Big\} \mathbin{/.} \big\{\texttt{Entry1} \rightarrow 2\big/63, \texttt{Entry2} \rightarrow 1\big/63\big\},$

$\big\{\texttt{Area1}, \texttt{d1}, \texttt{e1}, \texttt{e2}, \texttt{Area2}, \texttt{d2}, \texttt{f1}, \texttt{f2}\big\}, \texttt{Reals}\Big]$

Out[104]= $\{\{\texttt{Area1} \rightarrow 0.031746, \texttt{Area2} \rightarrow 0.015873, \texttt{f2} \rightarrow 0.7717, \texttt{f1} \rightarrow 0.765739,$

$\texttt{d2} \rightarrow 0.768724, \texttt{d1} \rightarrow 0.384362, \texttt{e1} \rightarrow 0.372313, \texttt{e2} \rightarrow 0.396164\}\}$

In[710]:=
```
Face1 = {{0, 0}, {-0.313, -0.542}, {0.313, -0.542}};
Face2 = {{-0.387, -0.7}, {0.387, -0.7}, {-0.446, -0.772}, {0.446, -0.772}};
Face3 = {{-0.190, -0.329}, {0.190, -0.329}, {-0.246, -0.426}, {0.246, -0.426}};
Face4 = {{-0.431, -0.748}, {0.431, -0.748}, {-0.446, -0.772}, {0.446, -0.772}};
Face5 = {{-0.215, -0.372}, {0.215, -0.372}, {-0.229, -0.396}, {0.229, -0.396}};
Face6 = {{-0.442, -0.766}, {0.442, -0.766}, {-0.446, -0.772}, {0.446, -0.772}};
```

$\texttt{scalingFactor} = \Big(3\Big/\Big(\dfrac{2}{\sqrt{3}} * .772\Big)\Big);$

```
Face1 = Map[RotationTransform[0], Face1] * scalingFactor
Face2 = Map[RotationTransform[π], Face2] * scalingFactor
```

$\texttt{Face3} = \texttt{Map}\Big[\texttt{RotationTransform}\Big[\dfrac{\pi}{3} * 2\Big], \texttt{Face3}\Big] * \texttt{scalingFactor}$

$\texttt{Face4} = \texttt{Map}\Big[\texttt{RotationTransform}\Big[-\dfrac{\pi}{3}\Big], \texttt{Face4}\Big] * \texttt{scalingFactor}$

$\texttt{Face5} = \texttt{Map}\Big[\texttt{RotationTransform}\Big[-\dfrac{\pi}{3} * 2\Big], \texttt{Face5}\Big] * \texttt{scalingFactor}$

$\texttt{Face6} = \texttt{Map}\Big[\texttt{RotationTransform}\Big[\dfrac{\pi}{3}\Big], \texttt{Face6}\Big] * \texttt{scalingFactor}$

```
Graphics[{Line[Append[Face1, Face1[[1]]]], Line[Append[Face2, Face2[[1]]]],
  Line[Append[Face3, Face3[[1]]]], Line[Append[Face4, Face4[[1]]]],
  Line[Append[Face5, Face5[[1]]]], Line[Append[Face6, Face6[[1]]]]}]
```

Out[717]= {{0., 0.}, {-1.05337, -1.82404}, {1.05337, -1.82404}}

Out[718]= {{1.3024, 2.35577}, {-1.3024, 2.35577}, {1.50096, 2.59808}, {-1.50096, 2.59808}}
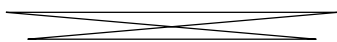
Out[719]= {{1.27858, -0.000150859}, {0.639162, 1.10736},
      {1.65552, -0.000142185}, {0.827638, 1.4338}}

Out[720]= {{-2.90529, -0.00250065}, {-1.45481, -2.51481},
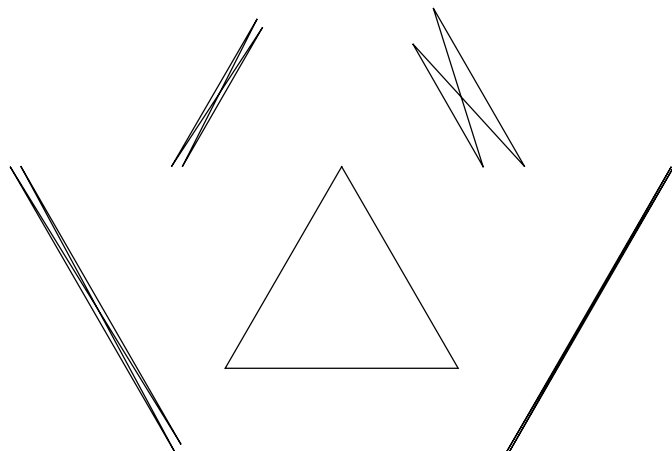   {-3.00048, 0.000832361}, {-1.49952, -2.59891}}

Out[721]= {{-0.722418, 1.25258}, {-1.44598, -0.000657804},
      {-0.768809, 1.33377}, {-1.53948, -0.00107631}}

Out[722]= {{1.48876, -2.57715}, {2.97626, -0.000729519},
      {1.49952, -2.59891}, {3.00048, 0.000832361}}

Out[723]=

In the picture, the Order of the Faces From The Bottom Triangle Going Clockwise is: (1,4,5,2,3,6). In the List of coordinates, printed out above the picture The order is just (1,2,3,4,5,6).