

Pensieve header: Solving the quadratic equation.

```

MakeExpression[RadicalBox[RowBox[{p_, ":", a_}], n_], StandardForm] :=
  HoldComplete[PersistentRoot[ToExpression@p, ToExpression@n, ToExpression@a]];
PersistentRoot[p_, n_, a_] :=
  PersistentRoot[p, n] = If[NumberQ[PersistentRoot[p, n]],
    MinimalBy[
      N[a1/n] Table[e2πik/n, {k, n}],
      Abs[# - PersistentRoot[p, n]] &
    ][[1],
    a1/n
  ];
  
```

$$\sqrt[3]{\text{test0} : 8}$$

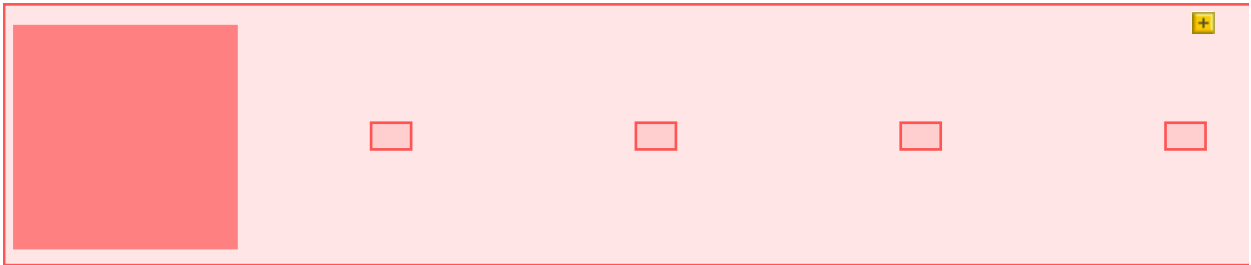
2

```

b1 = {(1, 1)/2};
{LocatorPane[Dynamic[b1], Graphics[{Pink, Rectangle[{-1, -1}, {1, 1}]}]},
  Dynamic[Graphics[{LightBlue, Rectangle[{-1, -1}, {1, 1}], Black,
    Point[r =  $\sqrt[2]{\text{test2} : \text{b1}[[1, 1]] + i \text{b1}[[1, 2]]}$ ; {Re[r], Im[r]}]}, PlotRange -> {-1, 1}]]}
  
```



```
{λ1, λ2} = {{1, 1} / 2, {1, -1} / 2};
GraphicsRow[{
  LocatorPane[Dynamic[{λ1, λ2}], Graphics[{Pink, Rectangle[{-1, -1}, {1, 1}]}]],
  Dynamic[Graphics[{LightBlue, Rectangle[{-1, -1}, {1, 1}], Black,
    {c, b, a} = CoefficientList[(x - {1, i}.λ1) (x - {1, i}.λ2), x];
    Text["a", {Re[a], Im[a]}],
    Text["b", {Re[b], Im[b]}], Text["c", {Re[c], Im[c]}]
  }, PlotRange → {-1, 1}]],
  Dynamic[Graphics[{LightBlue, Rectangle[{-1, -1}, {1, 1}], Black,
    d = b^2 - 4 a c;
    Text["d", {Re[d], Im[d]}]
  }, PlotRange → {-1, 1}]],
  Dynamic[Graphics[{LightBlue, Rectangle[{-1, -1}, {1, 1}], Black,
    dr = Sqrt[disc : d];
    Text["√d", {Re[dr], Im[dr]}]
  }, PlotRange → {-1, 1}]],
  Dynamic[Graphics[{LightBlue, Rectangle[{-1, -1}, {1, 1}], Black,
    r = (-b + Sqrt[disc : b^2 - 4 a c]) / (2 a);
    Text["r", {Re[r], Im[r]}]
  }, PlotRange → {-1, 1}]]
}]
```



```
Manipulate[{c, b, a} = CoefficientList[(x - {1, i}.λ1) (x - {1, i}.λ2), x];
Graphics[{LightBlue, Rectangle[{-1, -1}, {1, 1}], Black,
  r = (-b + Sqrt[disc : b^2 - 4 a c]) / (2 a);
  Point[{Re[r], Im[r]}]
}, PlotRange → {-1, 1}],
{{λ1, {1, 1} / 2, "λ1"}, {-1, -1}, {1, 1}},
{{λ2, {1, -1} / 2, "λ2"}, {-1, -1}, {1, 1}}, ControlPlacement → Left]
```

