

# Circle Passing Through 3 Points

In[273]:=

```
pointList = RandomReal[{1, 50}, {3, 2}];
```

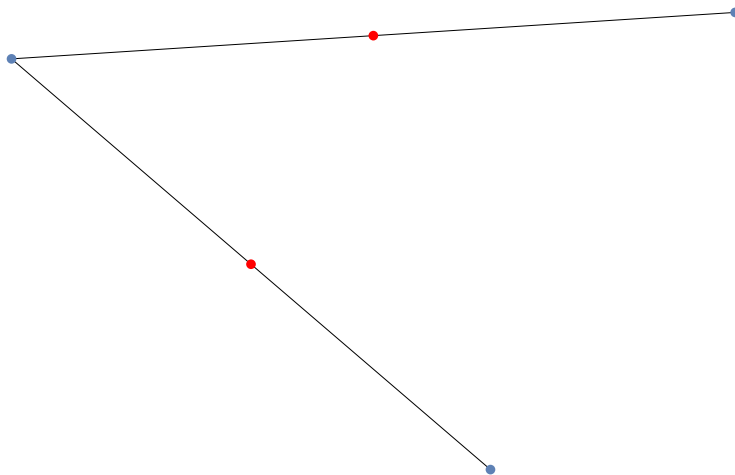
In[274]:=

```
midPoint = {(pointList[[1]] + pointList[[2]])/2, (pointList[[2]] + pointList[[3]])/2}
Show[
  Graphics[Line[pointList]],
  ListPlot[pointList, Axes→False],
  ListPlot[midPoint, PlotStyle→Red]
]
```

Out[274]=

```
{{23.6908, 32.4855}, {27.612, 39.8108}}
```

Out[275]=



In[276]:=

```

GetXY[pointList_] := Module[{midPoint1, midPoint2, slope1, slope2, c1, c2, intersection}
  midPoint1 = (pointList[[1]] + pointList[[2]]) / 2;
  midPoint2 = (pointList[[1]] + pointList[[3]]) / 2;

  slope1 = (pointList[[2, 2]] - pointList[[1, 2]]) /
    (pointList[[2, 1]] - pointList[[1, 1]]);
  slope2 = (pointList[[3, 2]] - pointList[[1, 2]]) /
    (pointList[[3, 1]] - pointList[[1, 1]]);

  slope1 = - 1 / slope1;
  slope2 = - 1 / slope2;

  c1 = midPoint1[[2]] - slope1*midPoint1[[1]];
  c2 = midPoint2[[2]] - slope2*midPoint2[[1]];
  intersection = Solve[
    {y == slope1 (x - midPoint1[[1]]) + midPoint1[[2]],
     y == slope2 (x - midPoint2[[1]]) + midPoint2[[2]]},
    {x, y}] ;
  Return[{x, y} /.intersection[[1]];
]

```

In[277]:=

```
center = GetXY[pointList];
```

In[278]:=

```
Show[
  Graphics[Circle[center, Norm[pointList[[1]] - center]]],
  Graphics[{Gray, Triangle[pointList]}],
  Graphics[Line[{midPoint[[2]], center}]],
  Graphics[Line[{midPoint[[1]], center}]],
  ListPlot[pointList, PlotStyle→Red],
  ListPlot[midPoint],
  ListPlot[{center}, PlotStyle→Red],
  PlotRange→All
]
```

Out[278]=

