

```

dl[a_, b_] := Sqrt[Plus@@((b-a)^2)] (* dlugosc odcinka ab *)
dlp[p_, a_] := Abs[p.Append[a, 1]] / Sqrt[p[[1]]^2+p[[2]]^2]
(* odleglosc punktu a od prostej p *)
pr[a_, b_] := {-(a[[2]]-b[[2]]), (a[[1]]-b[[1]]), -Det[{a, b}]}
(* prosta przechodzaca przez punkty a i b *)
tr[a_, b_, c_] := dl[a, b] + dl[b, c] + dl[c, a] # 2 * Max[dl[a, b], dl[b, c], dl[c, a]]
rso[a_, b_, c_] := Flatten[{x, y} /. NSolve[
  {dl[a, {x, y}]^2 == dl[b, {x, y}]^2, dl[a, {x, y}]^2 == dl[c, {x, y}]^2}, {x, y}]];
ro[a_, b_, c_] := dl[a, rso[a, b, c]];
rsw[a_, b_, c_] :=
  If[Length[Flatten[NSolve[{dlp[pr[a, b], {x, y}]^2 == dlp[pr[a, c], {x, y}]^2,
    dlp[pr[a, b], {x, y}]^2 == dlp[pr[b, c], {x, y}]^2}, {x, y}]]] > 0, Flatten[
    Select[Select[Select[Select[{x, y} /. NSolve[{dlp[pr[a, b], {x, y}]^2 == dlp[pr[a, c],
      {x, y}]^2, dlp[pr[a, b], {x, y}]^2 == dlp[pr[b, c], {x, y}]^2}, {x, y}]
      , #[[2]] < Max[Last /@ {a, b, c}] &]
      , #[[2]] > Min[Last /@ {a, b, c}] &]
      , #[[1]] > Min[First /@ {a, b, c}] &]
      , #[[1]] < Max[First /@ {a, b, c}] &]]]];
rw[a_, b_, c_] := dlp[pr[a, b], rsw[a, b, c]];
Off[InverseFunction::ifun]

```

```

Manipulate[Graphics[{Point[{a, b, c}],
  Text["A", a, {0, 1}], Text["B", b, {0, 1}], Text["C", c, {0, 1}],
  If[tr[a, b, c], {
    If[Length[Cases[rso[a, b, c], _?NumberQ]] > 0 && oo,
      {Red, Point[rso[a, b, c]], Circle[rso[a, b, c], ro[a, b, c]]}, {Point[a]}],
    If[Length[Cases[rsw[a, b, c], _?NumberQ]] > 0 && ow,
      {Blue, Point[rsw[a, b, c]], Circle[rsw[a, b, c], rw[a, b, c]]}, {Point[b]}],
    If[t, Line[{a, b, c, a}], {Point[c]}, {Point[a]}]],
  PlotRange -> {{-2.5, 8.5}, {-1.5, 6.5}}],
  Row[{Control[{{a, {0, 1}}, {-2, -1}, {8, 6}}],
    Control[{{b, {6, 1}}, {-2, -1}, {8, 6}}],
    Control[{{c, {3, 5}}, {-2, -1}, {8, 6}}]],
  Spacer[20], ImageSize -> {342, 83}, FrameMargins -> 0],
  Row[{Row[{" "}], ImageSize -> {0, 20}],
    Row[{Dynamic[a]}, ImageSize -> {80, 20}, Alignment -> Center],
    Row[{" "}], ImageSize -> {12, 20}],
    Row[{Dynamic[b]}, ImageSize -> {80, 20}, Alignment -> Center],
    Row[{" "}], ImageSize -> {12, 20}],
    Row[{Dynamic[c]}, ImageSize -> {80, 20}, Alignment -> Center}], Spacer[10]],
  Row[{Control[{{t, True, "Trójk„t"}, {True, False}}],
    Control[{{ow, True, Style["Okr„g wpisany", Blue]}, {True, False}}],
    Control[{{oo, True, Style["Okr„g opisany", Red]}, {True, False}}], Spacer[20]]]

```

a $\{0, 1\}$ b $\{6, 1\}$ c $\{3, 5\}$
 Trójk„t Okr„g wpisany Okr„g opisany

The main display area shows a large red rectangle containing a triangle with vertices labeled A, B, and C. The circumcenter is marked with a dot and labeled 'c'.



```

Manipulate[Graphics[{Point[{a, b, c}],
  Text["A", a, {0, 1}], Text["B", b, {0, 1}], Text["C", c, {0, 1}]
, If[tr[a, b, c], {
  If[Length[Cases[rso[a, b, c], _?NumberQ]] > 0 && oo,
    {Red, Point[rso[a, b, c]], Circle[rso[a, b, c], ro[a, b, c]]}, {Point[a]}],
  If[Length[Cases[rsw[a, b, c], _?NumberQ]] > 0 && ow,
    {Blue, Point[rsw[a, b, c]], Circle[rsw[a, b, c], rw[a, b, c]]}, {Point[b]}],
  If[t, Line[{a, b, c, a}], {Point[c]}], Point[a]
}], PlotRange -> {{-2.5, 8.5}, {-1.5, 6.5}},
Row[{Control[{{a, {0, 1}}, {-2, -1}, {8, 6}}],
  Control[{{b, {6, 1}}, {-2, -1}, {8, 6}}],
  Control[{{c, {3, 5}}, {-2, -1}, {8, 6}}]},
Spacer[20], ImageSize -> {342, 83}, FrameMargins -> 0],
Row[{Row[{""}, ImageSize -> {0, 20}],
  Row[{Dynamic[a]}, ImageSize -> {80, 20}, Alignment -> Center],
  Row[{""}, ImageSize -> {12, 20}],
  Row[{Dynamic[b]}, ImageSize -> {80, 20}, Alignment -> Center],
  Row[{""}, ImageSize -> {12, 20}],
  Row[{Dynamic[c]}, ImageSize -> {80, 20}, Alignment -> Center]}, Spacer[10]],
Row[
{Row[{"Trójk.,t", Checkbox[Dynamic[t], {False, True}, Enabled -> Dynamic[tr[a, b, c]]]},
  Spacer[5]], Row[Style["Okr.,g wpisany", Blue],
  Checkbox[Dynamic[ow], {False, True}, Enabled -> Dynamic[tr[a, b, c]]], Spacer[5]],
  Row[Style["Okr.,g opisany", Red], Checkbox[Dynamic[oo], {False, True},
  Enabled -> Dynamic[tr[a, b, c]]], Spacer[5]]], Spacer[20]]]

```

The screenshot shows the Mathematica Manipulate interface for the provided code. It features a 2D plot with a light red background. Three points are plotted: A at (0, 1), B at (6, 1), and C at (3, 5). A triangle is formed by these points. The plot area is enclosed in a red border. Above the plot, there are three sliders for the x and y coordinates of points a, b, and c. Below the sliders are three checkboxes: 'Trójk.,t' (checked), 'Okr.,g wpisany' (unchecked), and 'Okr.,g opisany' (unchecked). The plot area is currently empty, showing only the points and their labels.