

Correlation Mapping

Theme

Data generation

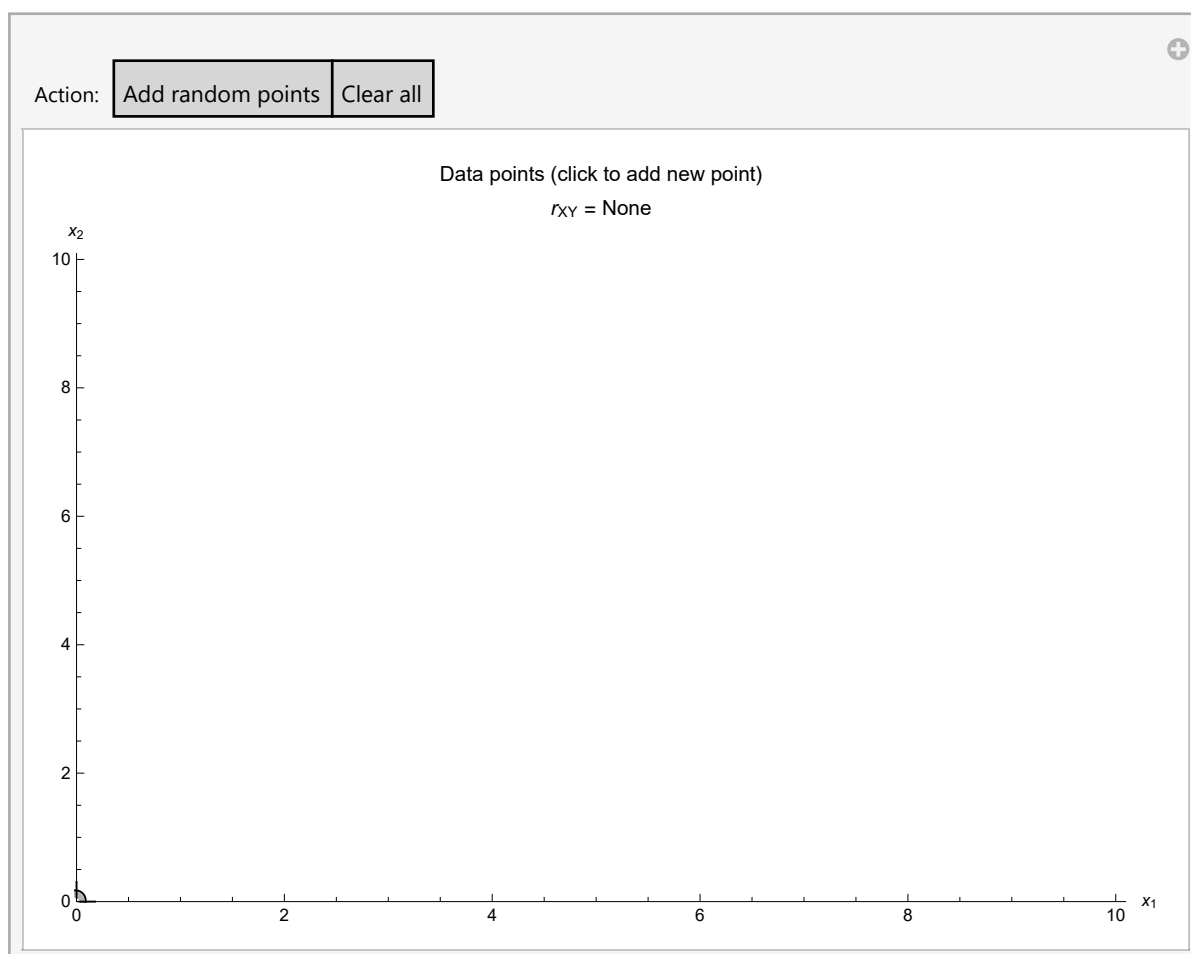
```

In[1]:= DynamicModule[{pt = {0, 0}, generateRandom, clear},
  data = {};
  generateRandom = (
    data = Union[data, Table[{RandomReal[{0, 10}], RandomReal[{0, 10}]}], {i, 1, 10}]];
  ) &;
  clear = (data = {}) &;

  Manipulate[
    ClickPane[
      Dynamic@Show[
        ListPlot[Append[data, {-1, -1}],
          PlotRange → {{0, 10.1}, {0, 10.1}},
          ImageSize → Large,
          AxesLabel → {"x1", "x2"},
          PlotLabel → "Data points (click to add new point)\nrXY = " <>
            ToString[ { Correlation[data][[1, 2]] Length[data] ≥ 2
                      [ None True
                    ]
          ],
        Graphics[{Yellow, Dynamic@Locator[pt]}]
      ]
    ],
    {pt = #; AppendTo[data, pt]; data = DeleteDuplicates[data];} &
  ]
  , {{action, None, "Action:"},
    Row[{Button["Add random points", generateRandom[]], Button["Clear all", clear[]]]} &]
]

```

Out[1]=



data

```
{}
```

```
(*Export[FileNameJoin[{NotebookDirectory[], "data1.mat"}], {"data" -> data}, "LabeledData"];*)
```

```
datasetsAssignment = {
  {{1.505648148148148`, 9.441774784298829`,
    {4.4608333333333325`, 7.2628223461156365`, {2.871018518518518`, 6.082556442099741`,
    {2.889722222222222`, 3.7825510906841497`, {4.6291666666666655`, 3.5707084925274506`,
    {6.705277777777777`, 4.629921483310946`, {6.798796296296295`, 6.566768095029339`,
    {7.322499999999999`, 2.9957071546735525`, {1.187685185185185`, 5.991766757175442`,
    {2.197685185185185`, 7.898350140585734`, {4.142870370370369`, 6.112819670407841`}},

  {{0.626574074074074`, 8.80624698982873`,
    {2.2537962962962963`, 6.082556442099741`, {3.0580555555555553`, 4.993080223008145`,
    {4.386018518518518`, 3.389129122678851`, {5.433425925925925`, 4.145709830381348`,
    {5.938425925925925`, 5.447028647629644`, {6.499537037037036`, 6.899663606418438`,
    {6.948425925925925`, 8.291772108591033`, {7.378611111111111`, 9.502301240915028`,
    {8.145462962962963`, 8.049666282126234`, {8.98712962962963`, 7.172032661191337`,
    {9.19287037037037`, 5.9615035288673415`, {9.54824074074074`, 4.932553766391945`}},

  {{1.3373148148148148`, 8.89703667475303`, {2.010648148148148`, 7.414138487656135`,
    {3.750092592592592`, 7.868086912277635`, {5.751388888888888`, 6.506241638413139`,
    {5.339907407407407`, 4.357552428538048`, {7.790092592592591`, 2.1785999903548556`,
    {8.519537037037036`, 3.9641304605327488`, {7.154166666666666`, 3.9036040039165494`,
    {2.6652777777777774`, 8.443088250131531`, {2.8523148148148145`, 7.656244314120935`,
    {3.9932407407407404`, 6.778610693186038`, {4.984537037037036`, 6.26413581194834`,
    {6.536944444444443`, 5.507555104245843`, {6.4060185185185174`, 4.720711168235246`,
    {7.790092592592591`, 4.387815656846147`, {8.201574074074074`, 2.904917469749253`}},

  {{1.1689814814814814`, 2.329916131895355`, {1.8049074074074074`, 4.054920145457048`,
    {3.1515740740740736`, 1.3312295977280586`, {4.236388888888888`, 4.387815656846147`,
    {4.142870370370369`, 8.866773446444931`, {8.3325`, 8.92729990306113`,
    {8.519537037037036`, 5.174659592856744`, {6.331203703703703`, 6.203609355332141`,
    {6.480833333333332`, 8.624667619980132`, {4.760092592592592`, 6.597031323337439`,
    {6.088055555555554`, 4.206236286997548`, {8.238981481481481`, 7.111506204575137`,
    {9.230277777777777`, 9.623354154147428`, {1.561759259259259`, 1.7246515657333572`}}
};
```

```

datasetsExam = {
  {2.553055555555554`, 7.323348802731836`},
  {4.180277777777777`, 8.140455967050533`}, {6.031944444444443`, 7.323348802731836`},
  {6.312499999999999`, 5.749660930710642`}, {4.423425925925925`, 2.1785999903548556`},
  {8.3325`, 6.112819670407841`}, {2.62787037037037`, 3.5404452642193505`},
  {3.9745370370370368`, 5.5983447891701426`}, {5.115462962962962`, 3.3286026660626513`},
  {3.001944444444443`, 4.327289200229948`}, {2.2537962962962963`, 5.477291875937743`},
  {4.965833333333332`, 6.566768095029339`}, {5.358611111111111`, 8.594404391672033`},
  {7.696574074074073`, 7.747033999045234`}, {7.378611111111111`, 3.9641304605327488`},
  {4.423425925925925`, 3.9641304605327488`}, {5.975833333333332`, 4.4786053417704474`},
  {8.220277777777778`, 4.8417640814676455`}, {3.8810185185185184`, 7.474664944272336`}},

  {0.7013888888888888`, 5.507555104245843`},
  {0.8323148148148147`, 7.050979747958937`}, {1.8984259259259257`, 8.715457304904431`},
  {3.13287037037037`, 9.441774784298829`}, {4.4047222222222215`, 9.593090925839327`},
  {5.751388888888888`, 9.441774784298829`}, {7.228981481481481`, 8.83651021813683`},
  {8.201574074074074`, 8.110192738742434`}, {8.98712962962963`, 6.960190063034638`},
  {9.436018518518518`, 5.477291875937743`}, {9.75398148148148`, 4.2970259719218475`},
  {9.566944444444443`, 2.7536013282087533`}, {8.98712962962963`, 1.9970206205062562`},
  {7.790092592592591`, 1.5733354241928579`}, {6.368611111111111`, 1.6035986525009576`},
  {4.797499999999999`, 1.8759677072738565`}, {3.282499999999998`, 2.5114955017439544`},
  {1.9732407407407404`, 3.2680762094464515`}, {1.0941666666666665`, 4.266762743613747`},
  {3.5443518518518515`, 7.353612031039936`}, {4.479537037037036`, 7.686507542429035`},
  {5.115462962962962`, 7.353612031039936`}, {5.227685185185185`, 6.687821008261738`},
  {4.722685185185184`, 6.23387258364024`}, {3.899722222222222`, 6.23387258364024`},
  {3.525648148148148`, 6.5365048667212395`}, {4.3486111111111105`, 7.020716519650837`},
  {3.9745370370370368`, 7.716770770737135`}, {6.761388888888888`, 6.3246622685645395`},
  {7.397314814814814`, 6.566768095029339`}, {8.108055555555556`, 6.23387258364024`},
  {8.3325`, 5.507555104245843`}, {7.640462962962962`, 5.174659592856744`},
  {6.686574074074073`, 5.265449277781044`}, {6.948425925925925`, 5.628608017478243`},
  {7.58435185185185`, 5.810187387326842`}, {3.3386111111111108`, 5.174659592856744`},
  {3.9184259259259258`, 4.599658255002846`}, {4.647870370370369`, 4.206236286997548`},
  {5.470833333333332`, 4.1154466020732485`}, {6.2937962962962954`, 4.024656917148949`},
  {7.228981481481481`, 3.9036040039165494`}, {6.3499074074074064`, 3.449655579295051`},
  {6.3499074074074064`, 2.904917469749253`}, {6.4621296296296284`, 2.6628116432844537`},
  {6.649166666666665`, 2.693074871592554`}, {6.948425925925925`, 2.814127784824953`},
  {7.07935185185185`, 3.237812981138352`}, {7.228981481481481`, 3.63123494914365`},
  {6.66787037037037`, 3.9036040039165494`}, {7.023240740740739`, 3.933867232224649`}},

  {0.944537037037037`, 1.5128089675766585`}, {1.6178703703703703`, 0.9075444014146603`},
  {2.4595370370370366`, 0.8470179447984609`}, {3.001944444444443`, 1.422019282652358`},
  {3.6191666666666666`, 2.087810305430556`}, {3.712685185185185`, 3.177286524522152`},
  {3.4882407407407405`, 4.539131798386647`}, {3.319907407407407`, 5.870713843943042`},
  {3.376018518518518`, 7.202295889499437`}, {3.843611111111111`, 8.019403053818134`},
  {4.479537037037036`, 8.443088250131531`}, {4.928425925925925`, 8.53387793505583`},
  {5.695277777777776`, 8.53387793505583`}, {6.4060185185185174`, 8.412825021823432`},
  {7.041944444444443`, 8.382561793515332`}, {7.864907407407407`, 8.352298565207231`},
  {8.613055555555555`, 8.443088250131531`}, {9.305092592592592`, 9.29045864275833`}},

  {1.3747222222222222`, 4.569395026694746`},
  {8.3325`, 5.689134474094442`}, {4.479537037037036`, 5.235186049472944`}}
};

adjustedMarkers = {{"●", 8.96`}, {"■", 10.88`}, {"◆", 10.88`}, {"▲", 10.88`}};

```

```

In[11]:= plotTask[datasets_, datasetNr_] := ListPlot[datasets[[datasetNr]],
  PlotTheme → "myTheme",
  AxesLabel → {x, y},
  PlotRange → {{0, 10.1}, {0, 10.1}},
  TicksStyle → Directive[FontSize → 20],
  PlotStyle → Directive[ColorData[97, "ColorList"][[datasetNr]]],
  PlotMarkers → {adjustedMarkers[[datasetNr, 1]], adjustedMarkers[[datasetNr, 2]] * 1.8},
  LabelStyle → Directive[FontFamily → "Libertinus Serif", FontSize → 24]
]

plotSol[datasets_, datasetNr_] := Block[{lm, data},
  data = datasets[[datasetNr]];
  lm = LinearModelFit[data, x, x];

  Show[
    plotTask[datasets, datasetNr],

    Plot[lm[x], {x, 0, 10},
      PlotTheme → "myTheme",
      PlotStyle → ■,
      PlotLegends → {"Trend (rxy = " <> ToString[Correlation[data][[1, 2]]] <> " )"}
    ]
  ]
]

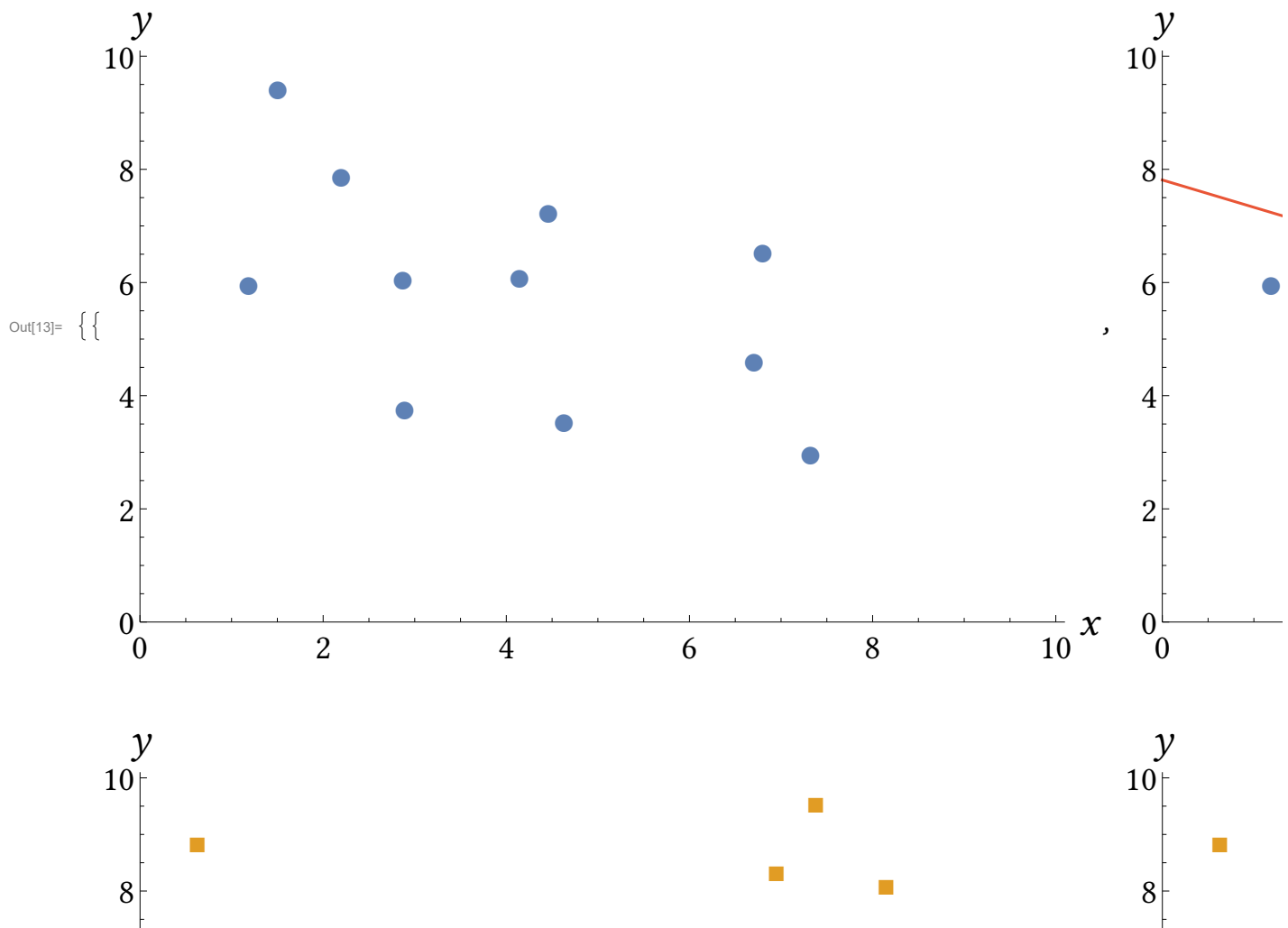
```

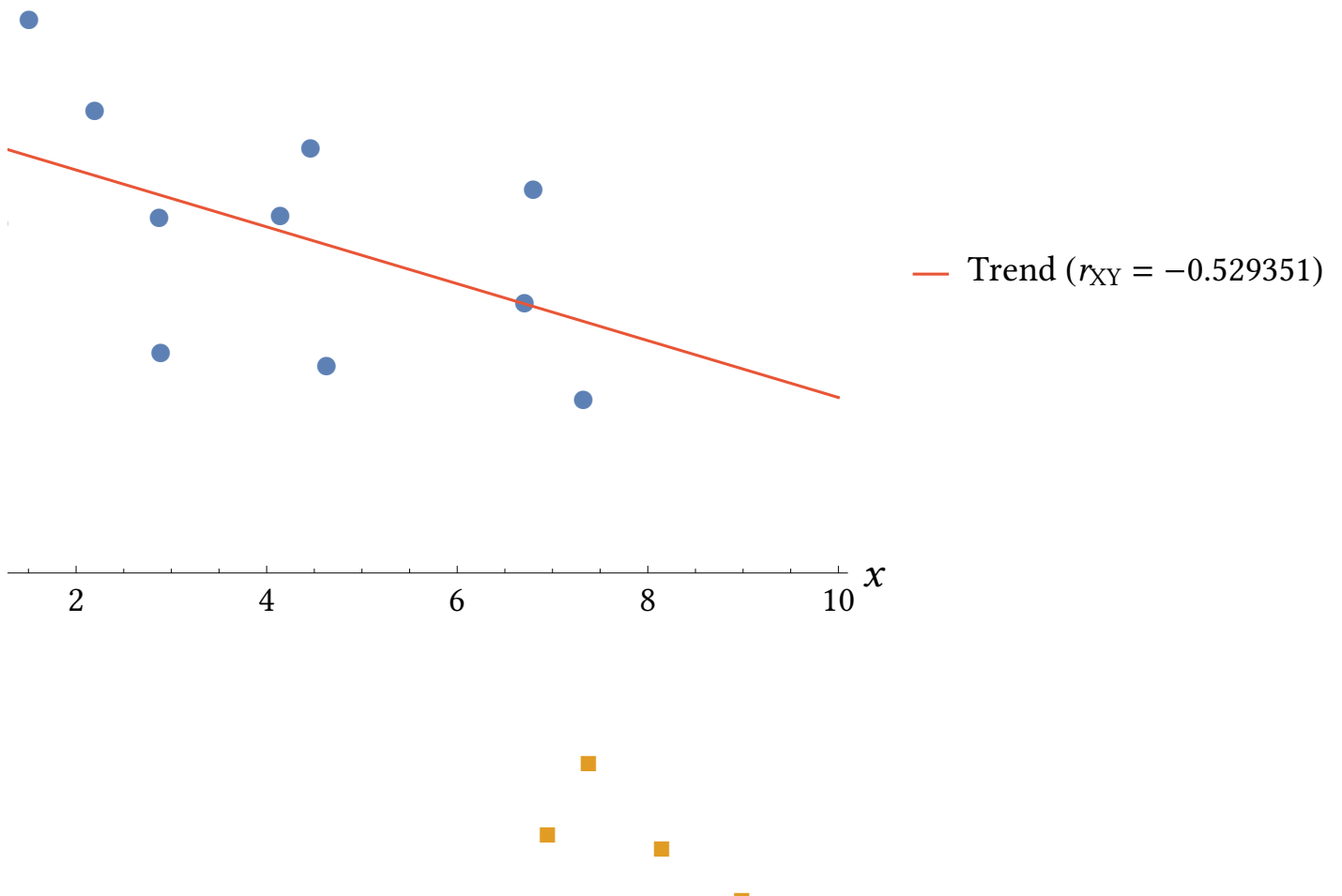
Assignment

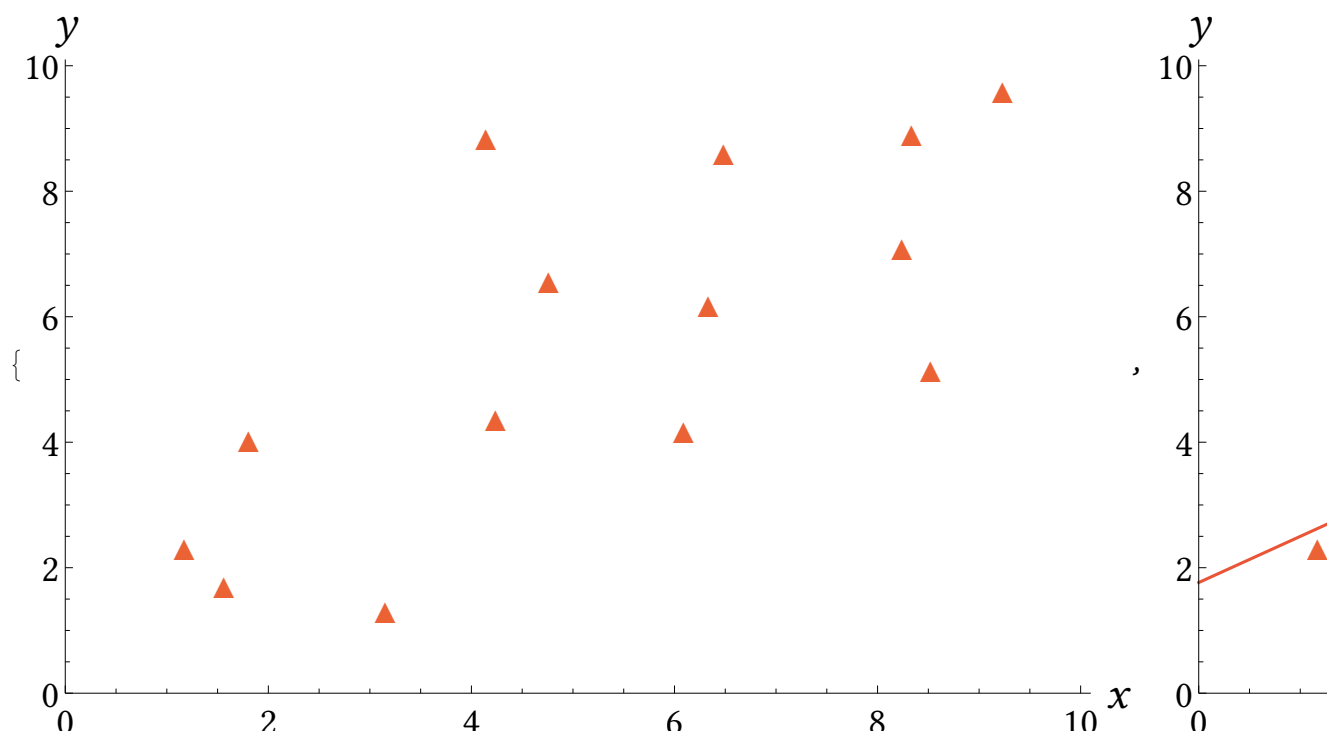
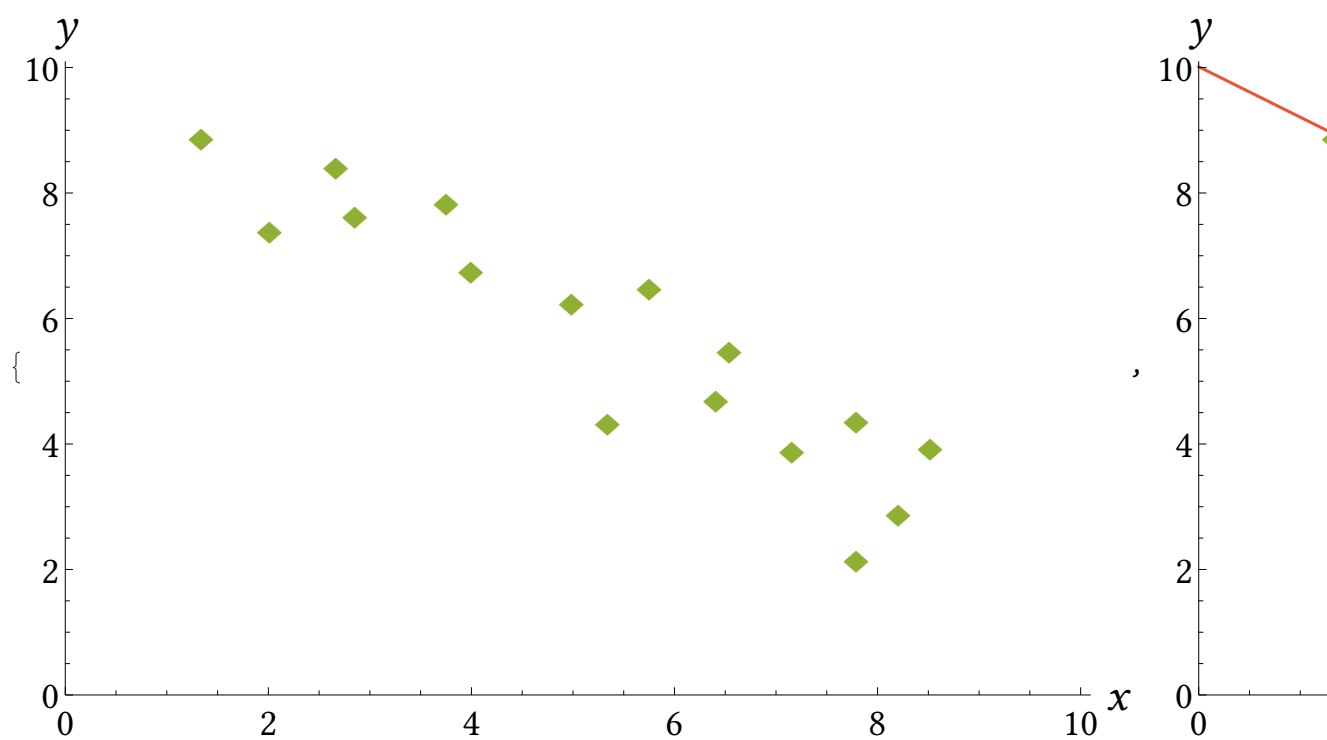
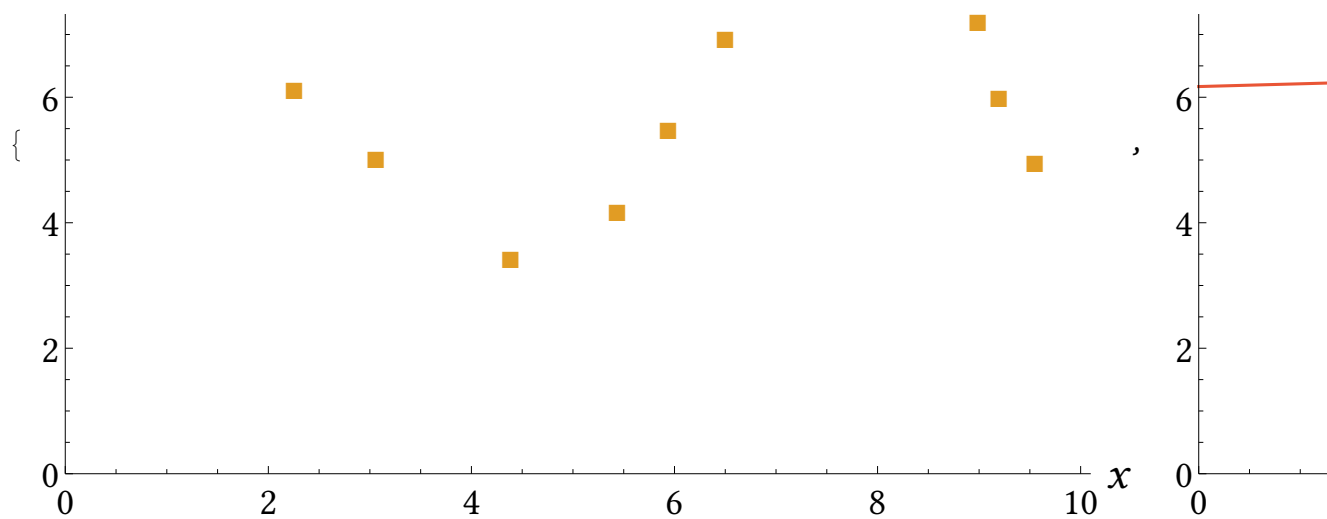
```

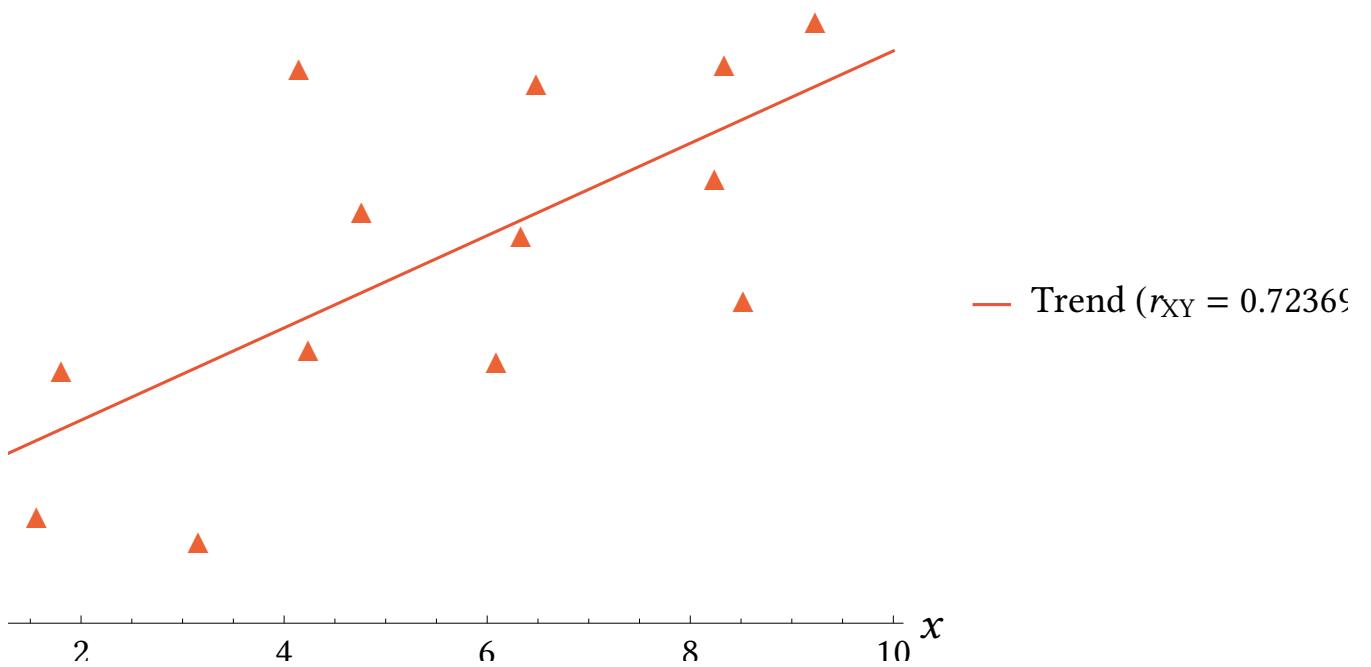
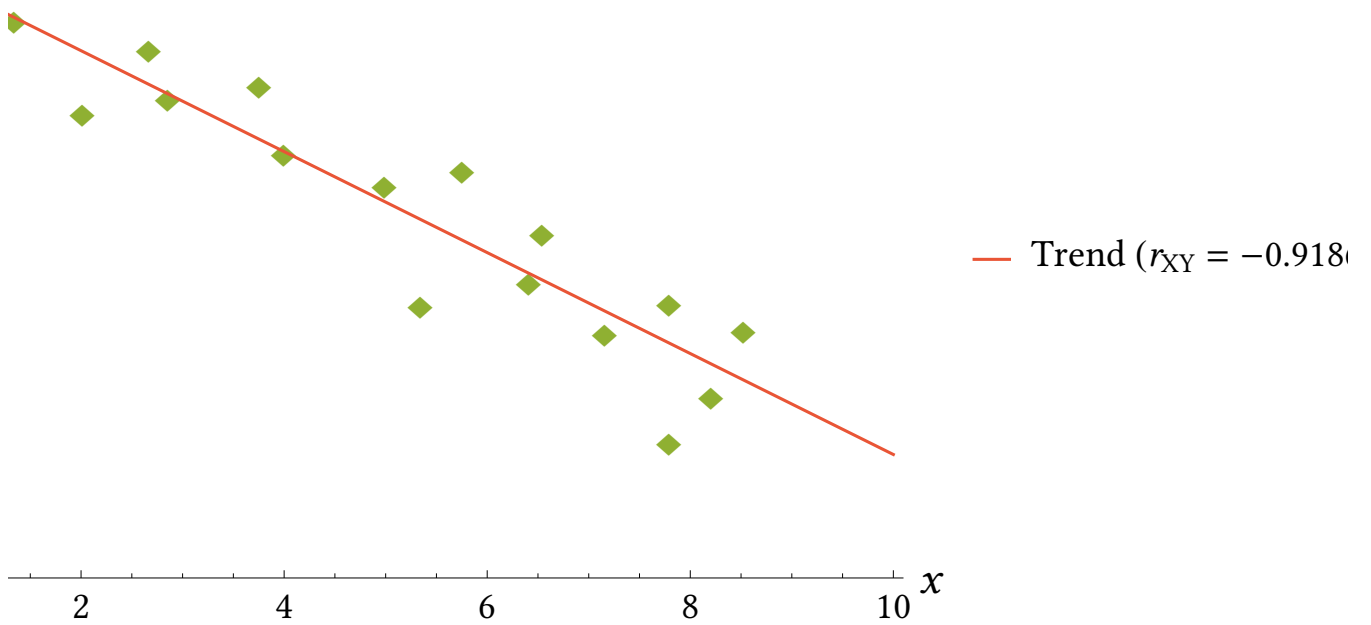
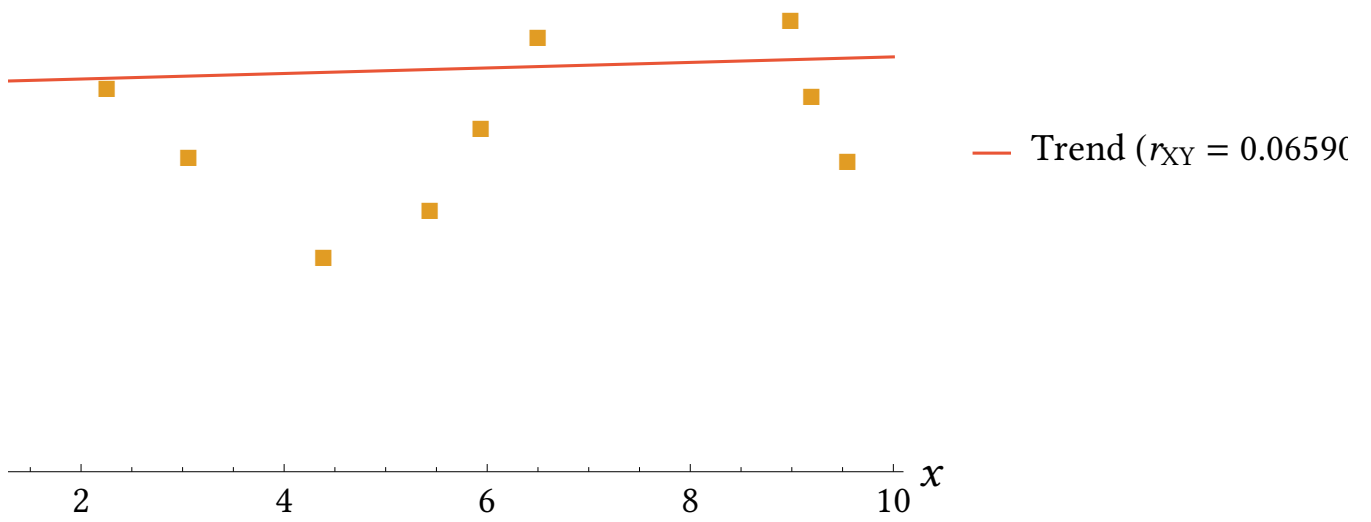
In[13]:= Table[{plotTask[datasetsAssignment, i], plotSol[datasetsAssignment, i]},
  {i, 1, Length[datasetsAssignment]}]

```









147) },

685) },

9) }}

```

In[14]:= (*Do[
  Export[
    FileNameJoin[{
      NotebookDirectory[],
      "datasetX"<>ToString[i]<>".pdf"
    }],
    plotTask[datasetsAssignment,i],
    Antialiasing->True
  ]
, {i,1,Length[datasetsAssignment]}]*)

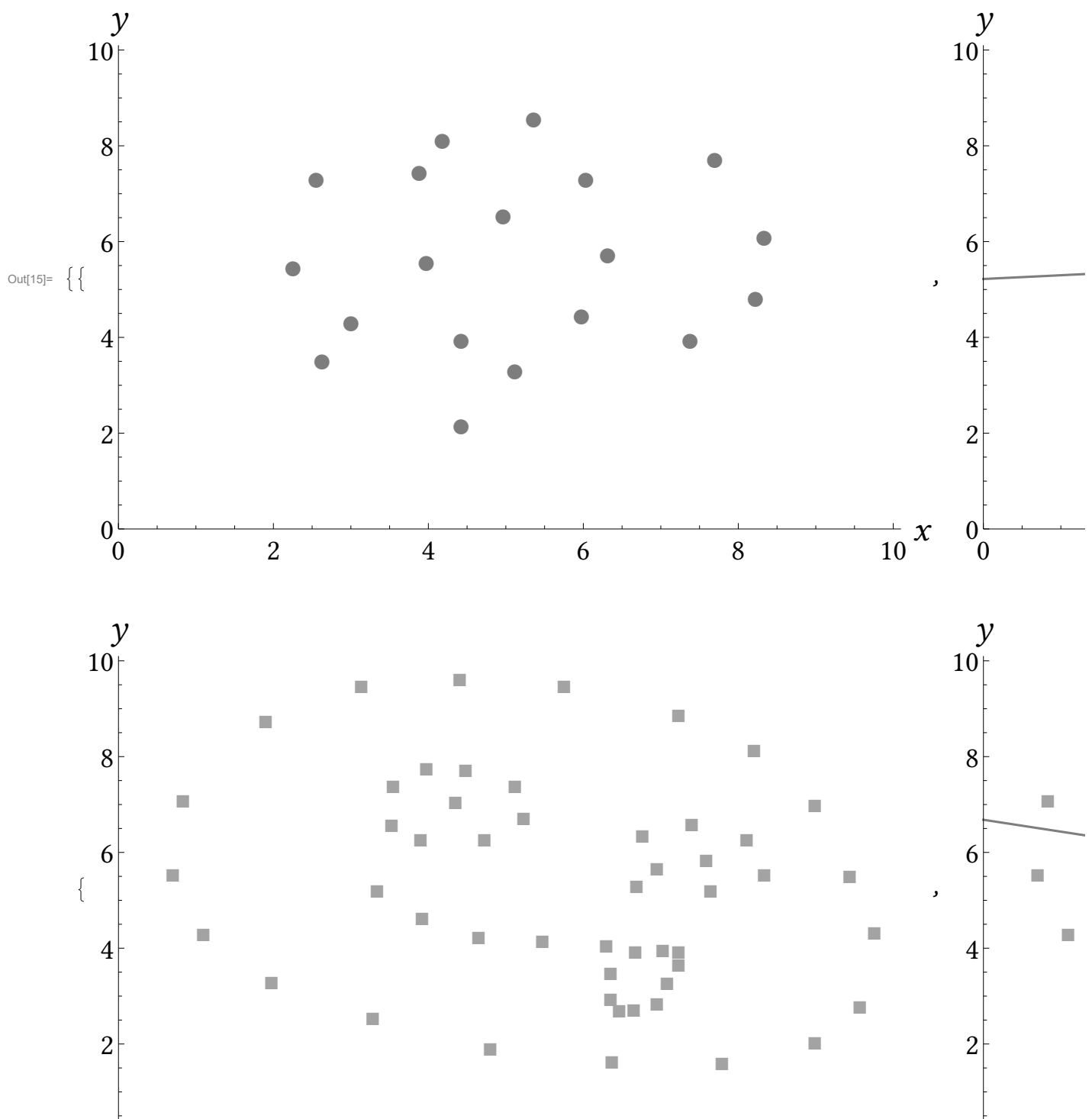
```

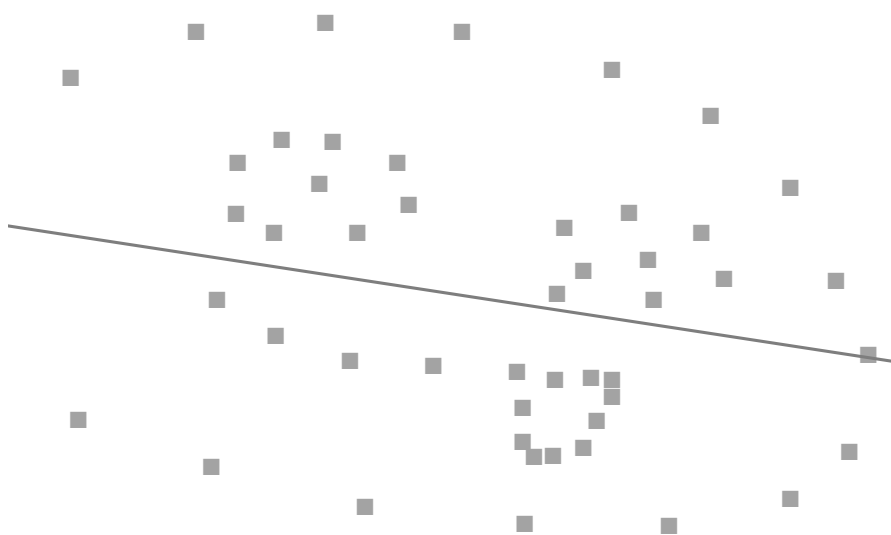
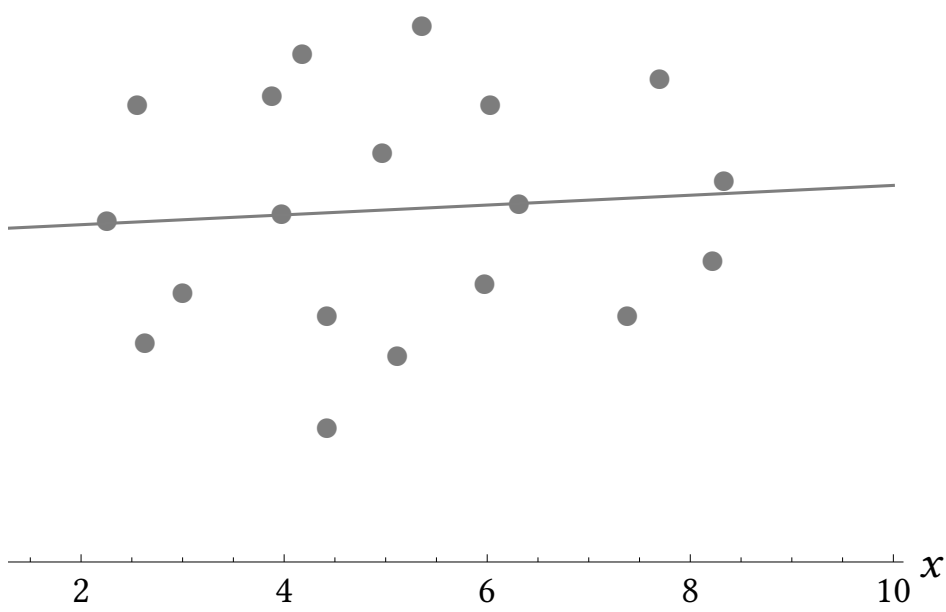
Exam

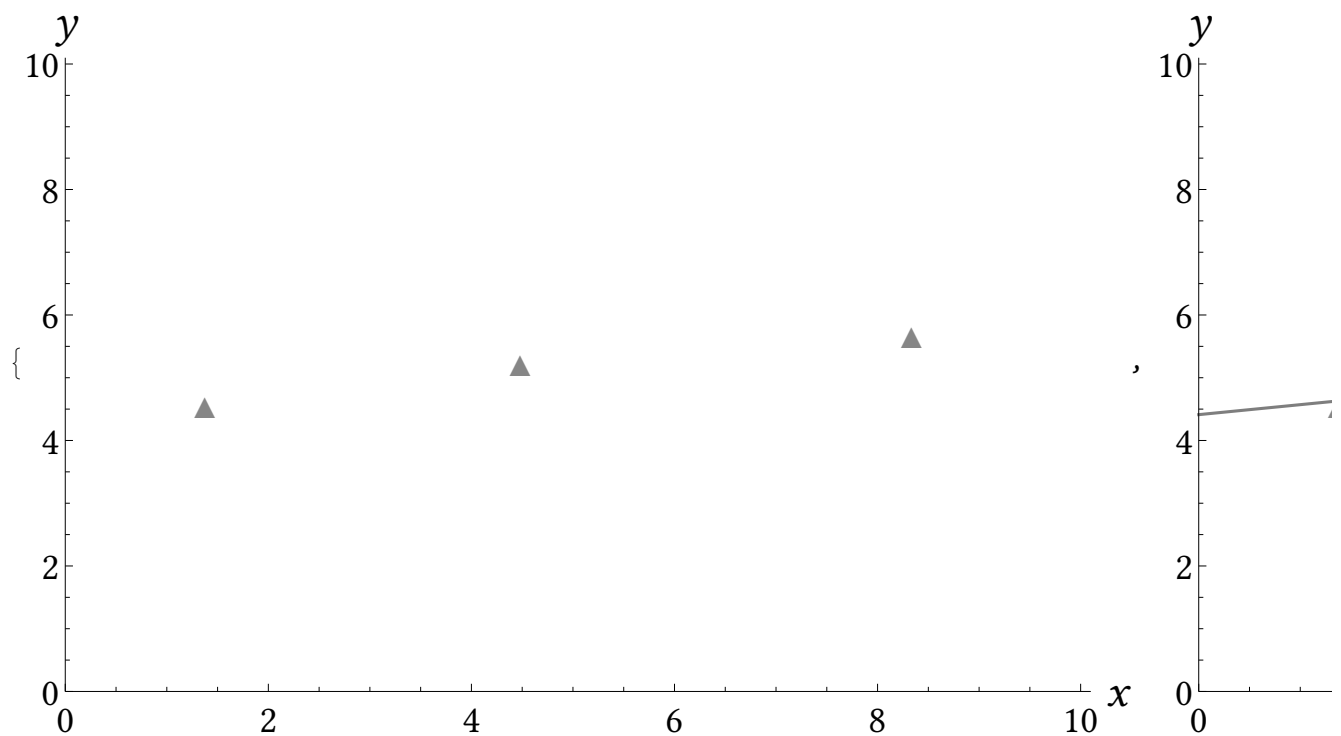
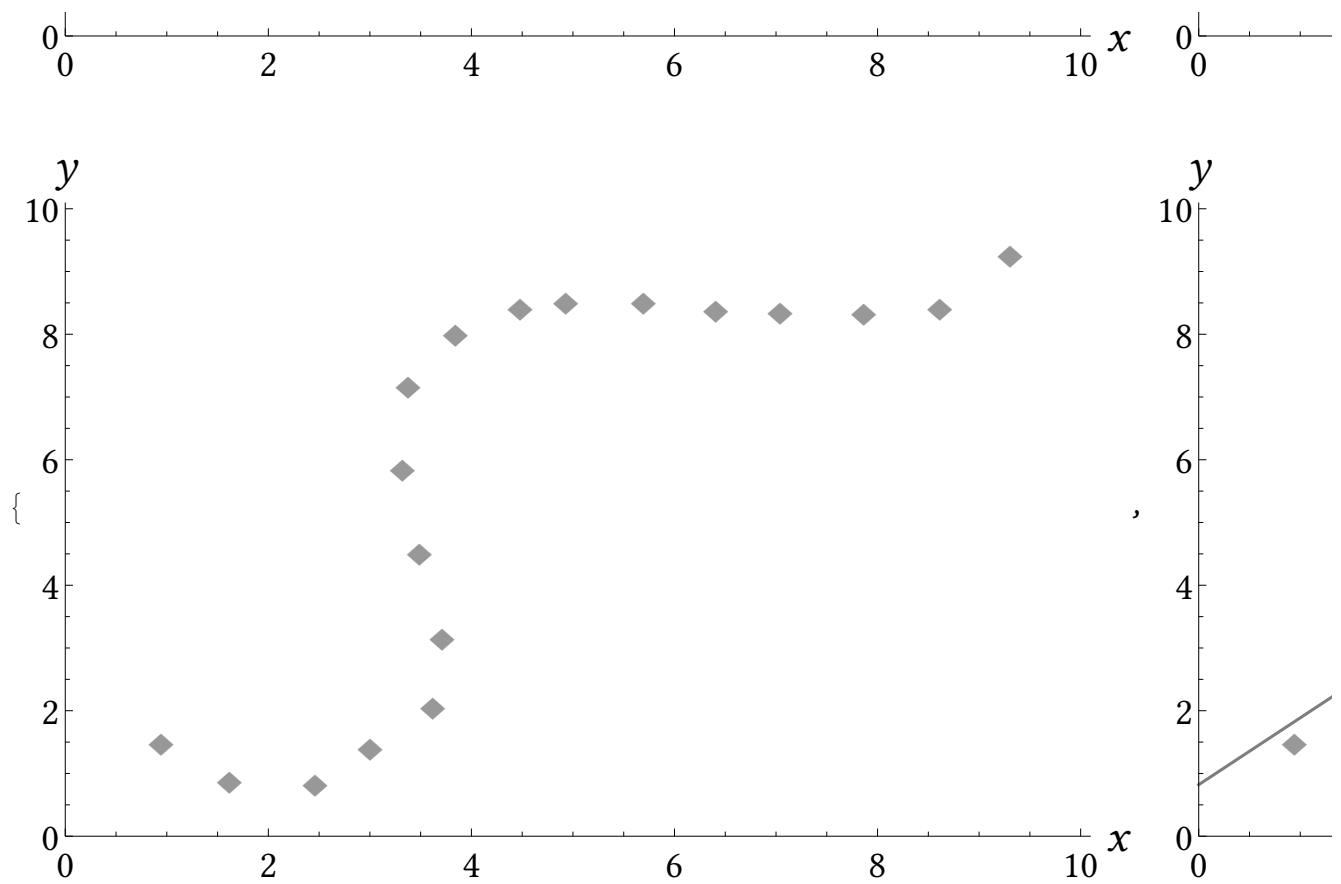
```

In[15]:= Table[{plotTask[datasetsExam, i], plotSol[datasetsExam, i]}, {i, 1, Length[datasetsExam]}] /.
  x : _RGBColor | _Hue | _CMYKColor -> ColorConvert[x, "Grayscale"]

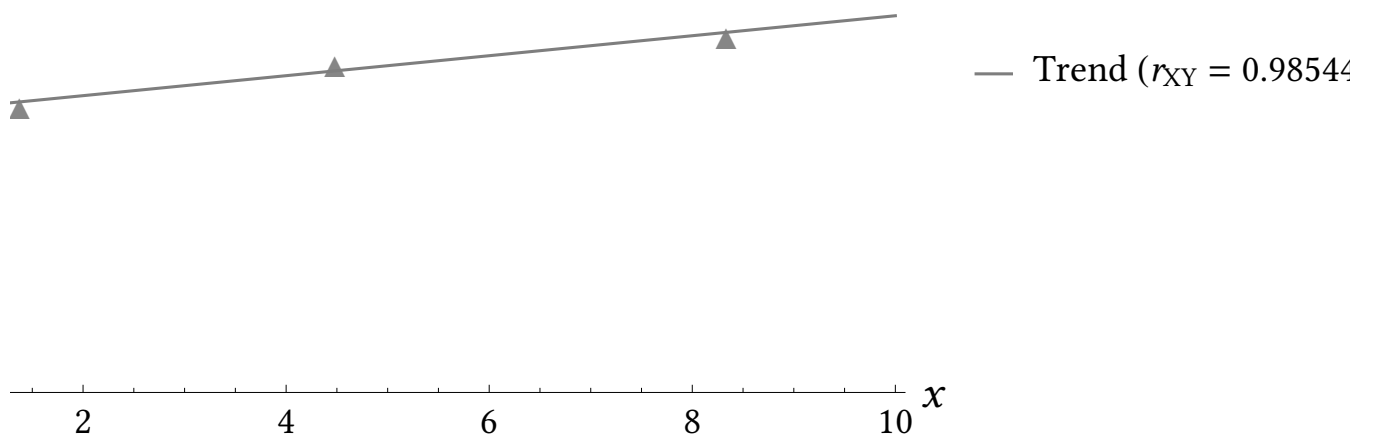
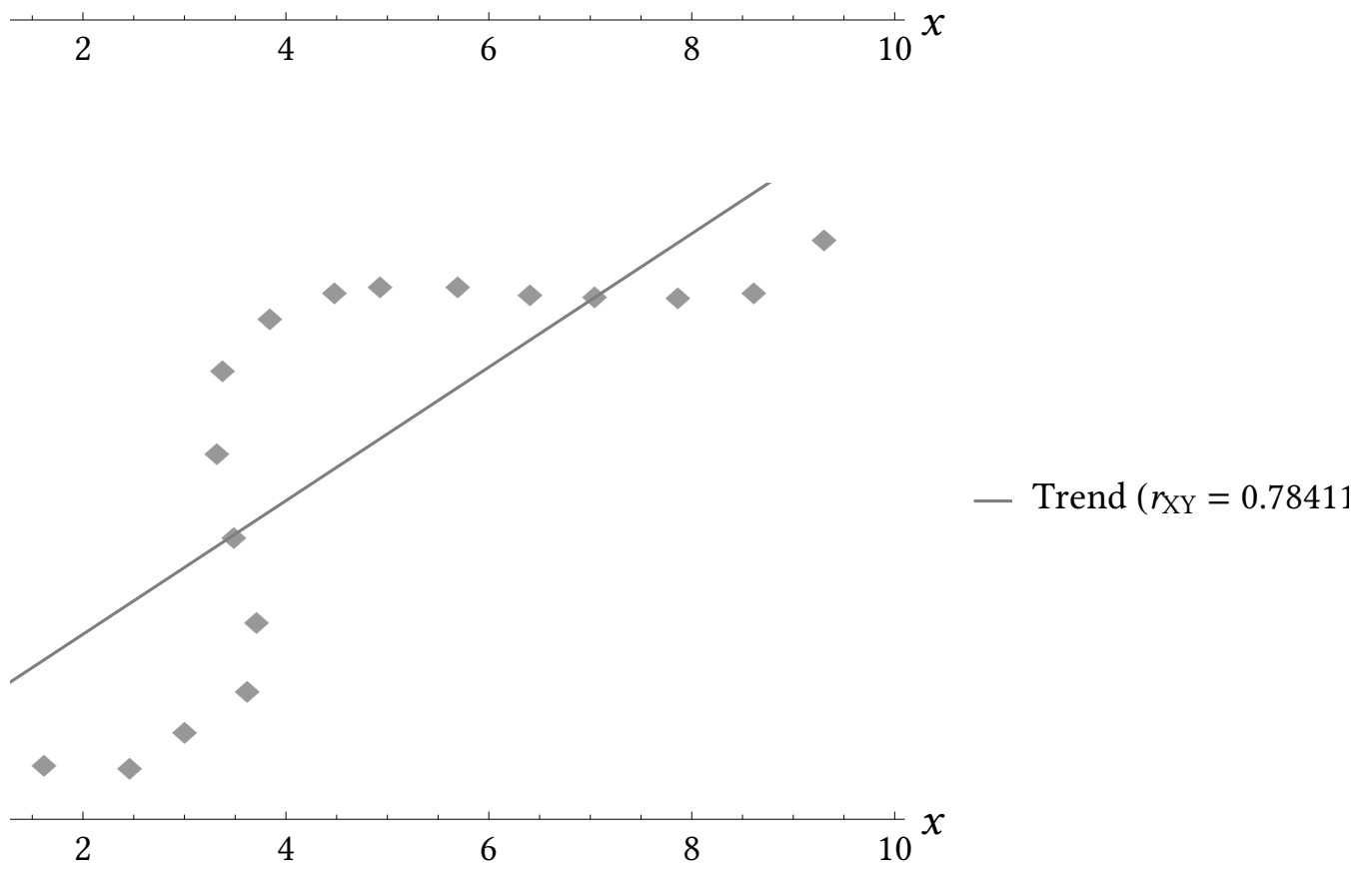
```







```
(*Do[
  Export[
    FileNameJoin[{
      NotebookDirectory[],
      "datasetX"<>ToString[i]<>".pdf"
    }],
    plotTask[datasetsExam,i]/.x:_RGBColor|_Hue|_CMYKColor->ColorConvert[x,"Grayscale"],
    Antialiasing->True
  ]
  ,{i,1,Length[datasetsExam]})
```



19) },

19) }}