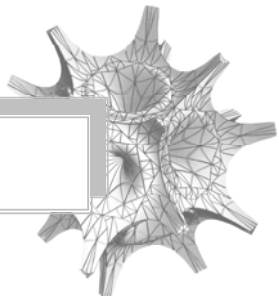


Praktikum № 5: **Funkcie, lineárne funkcie**

Cieľ: Budovanie geometrickej predstavivosti o grafoch funkcií, zobraziť body v rovine, graf funkcie v rovine, vytvárať v rovine grafické objekty

Zadanie 1: Zostrojte graf funkcie danej rovnicou y = 2 x – 1, ak:

a) D={-2, -1, 0, 1, 2}
b) D = R

Zadanie 2: Daná je rovnica funkcie $y = \frac{1}{x-10}$. Vieme vypočítať funkčné hodnoty pre všetky reálne čísla ?

Zadanie 3: Vyjadrite tabuľkou i graficky funkciu $y = \frac{15}{5-x}$, (0<x<5). Pre x zvoľte hodnoty: 0.5, 1.0, 1.5, ... 4.5.

Zistite z grafu: a) funkčnú hodnotu y pre x = 1.2
b) hodnotu x pre y = 8.

Metodický postup:

- ✓ ListPlot[{$y_1$, $y_2$, ...}] ..... zobrazí body {1, $y_1$}, {2, $y_2$}, ....
- ✓ ListPlot[{ {$x_1$, $y_1$}, {$x_2$, $y_2$}, ...} ] ..... zobrazí špecifikované body
- ✓ PlotLabel→"popis" .....označenie obrázku
- ✓ DefaulColor→farba .....špecifikuje farbu kreslenia
- ✓ AxesLabel→{$x_{návestie}$, $y_{návestie}$} .....popis obidvoch osí
- ✓ AxesOrigin→{x, y} .....súradné osi sa pretínajú v bode {x, y}, preddefinovaná hodnota je automatic.

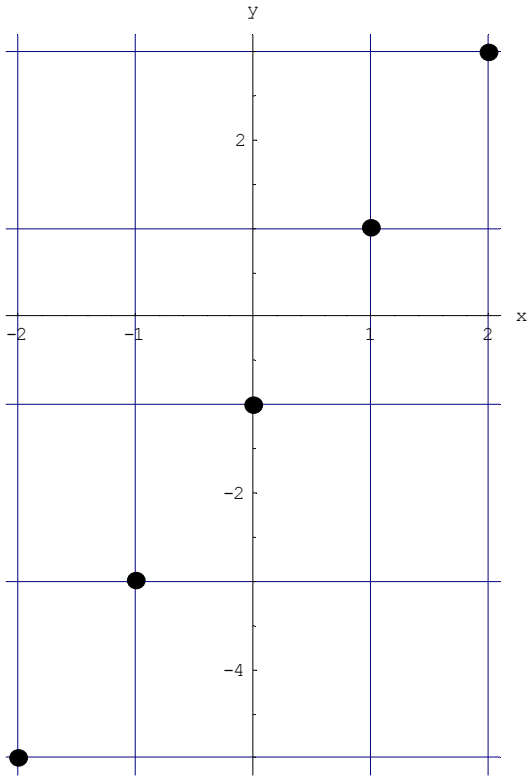
- ✓ GridLines→{{x-ové hodnoty}, {y-ové hodnoty}} .....mriežka sa zobrazí v predpísaných hodnotách
- ✓ Background→farba .....špecifikuje farbu pozadia
- ✓ Show[$g_1$, $g_2$, ....] .....zobrazenie niekoľkých grafických objektov do jedného obrázku
- ✓ TableForm[zoznam] .....zobrazenie zoznamu formou tabuľky

Riešenie:

Zadanie 1:

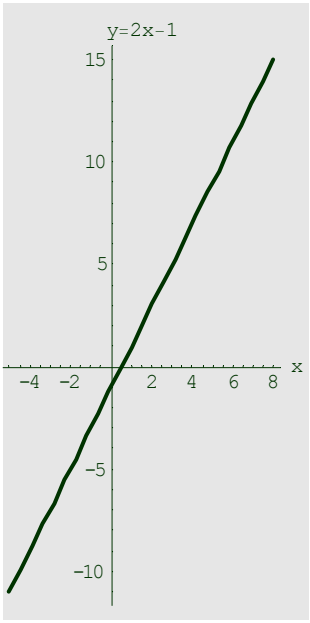
**In[1]:=**

```
body = ListPlot[{{-2, -5}, {-1, -3}, {0, -1}, {1, 1}, {2, 3}},
  AxesOrigin → {0, 0}, PlotStyle → PointSize[0.04],
  AspectRatio → 1.61803, AxesLabel → {"x", "y"},
  GridLines → {{-2, -1, 1, 2}, {-5, -3, -1, 1, 3}}]
```



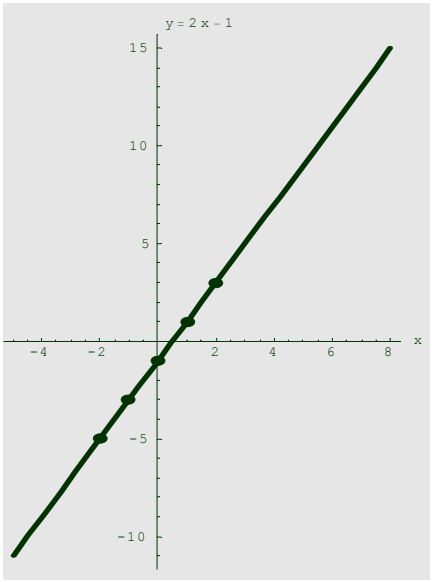

Out[1]= - Graphics -

```
In[2]:= priamka = Plot[2 x - 1, {x, -5, 8}, PlotStyle → {Thickness[0.02]},
          DefaultColor → RGBColor[0, 0.2, 0], AspectRatio → Automatic,
          AxesLabel → {"x", ""}, Background → GrayLevel[0.9],
          Frame → False, PlotLabel → "y=2x-1"]
```



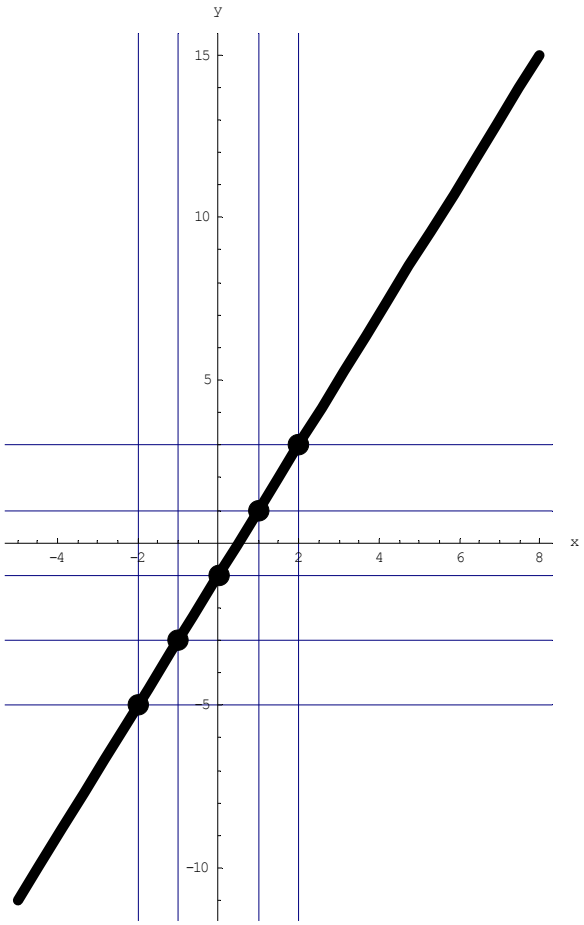

Out[2]= - Graphics -

```
In[3]:= Show[priamka, body]
```




Out[3]= - Graphics -

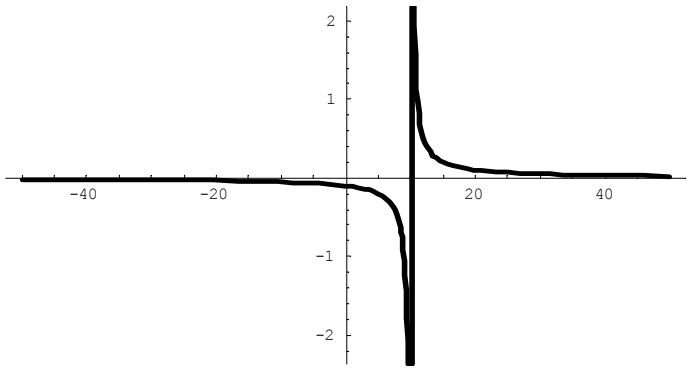
**In[4]:=** `Show[body, priamka]`




Out[4]= - Graphics -

Zadanie 2:

**In[5]:=** `Plot[1/(x - 10), {x, -50, 50}, PlotStyle→{Thickness[0.0095]}]`




Out[5]= - Graphics -

Zadanie 3:

**In[6]:=**
```
xmin = 1/2;
xmax = 9/2;
v[x_] = 15/(5 - x);
StyleForm[TableForm[Table[{x, v[x]}, {x, xmin, xmax, 1/2}]],
TableHeadings → {None, {"x", v[x], "krok = 1/2"}}], FontSize → 16]
```

Out[6]//StyleForm

| x | $\frac{15}{5-x}$ | krok = $\frac{1}{2}$ |
|---|---|---|
| $\frac{1}{2}$ | $\frac{10}{3}$ | |
| 1 | $\frac{15}{4}$ | |
| $\frac{3}{2}$ | $\frac{30}{7}$ | |
| 2 | 5 | |
| $\frac{5}{2}$ | 6 | |
| 3 | $\frac{15}{2}$ | |
| $\frac{7}{2}$ | 10 | |
| 4 | 15 | |
| $\frac{9}{2}$ | 30 | |

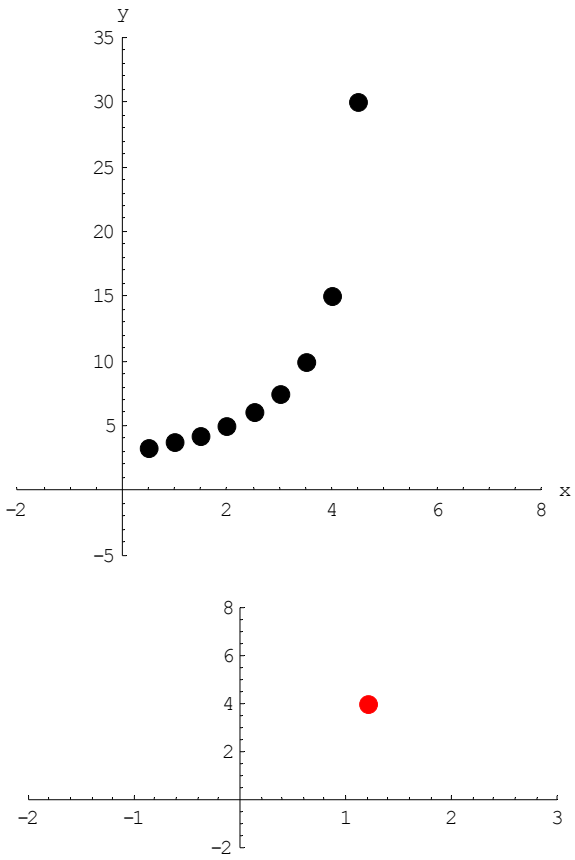
**In[7]:=**
```
v /. x → 6/5
```

Out[7]= $\frac{75}{19}$

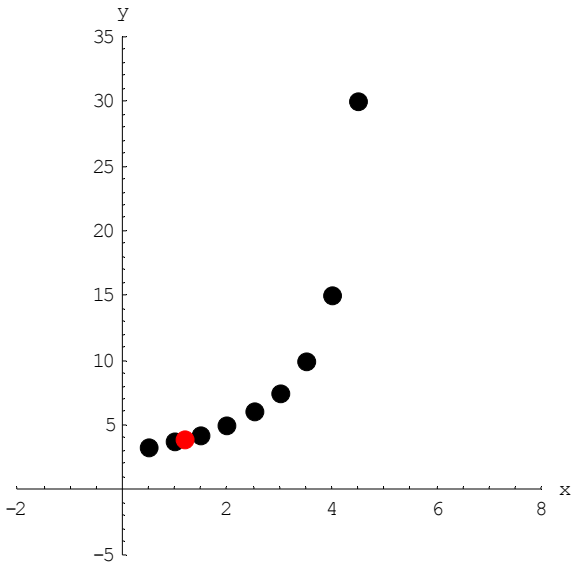
**In[8]:=**
```
Solve[15/(5 - x) == 8, x]
```

Out[8]= $\left\{\left\{x \to \frac{25}{8}\right\}\right\}$

**In[9]:=**
```
body = ListPlot[{{1/2, 10/3}, {1, 15/4}, {3/2, 30/7}, {2, 5}, {5/2, 6},
{3, 15/2}, {7/2, 10}, {4, 15}, {9/2, 30}}, AxesOrigin → {0, 0},
PlotStyle → PointSize[0.035], AspectRatio → 0.985,
AxesLabel → {"x", "y"}, PlotRange → {{-2, 8}, {-5, 35}}];
bod2 = ListPlot[{{6/5, 75/19}}, PlotStyle → {RGBColor[1., 0, 0],
PointSize[0.035]}, AxesOrigin → {0, 0}, PlotRange → {{-2, 3}, {-2, 8}},
AspectRatio → 0.45];
Show[body, bod2]
```

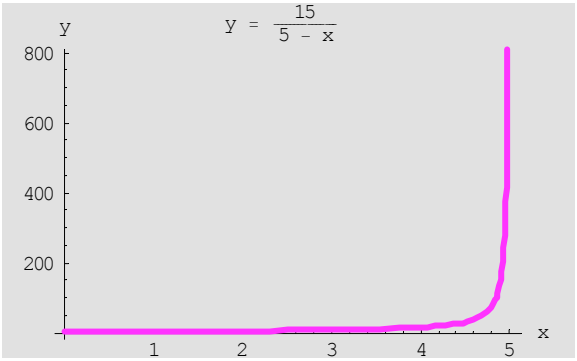



Out[9]= - Graphics -



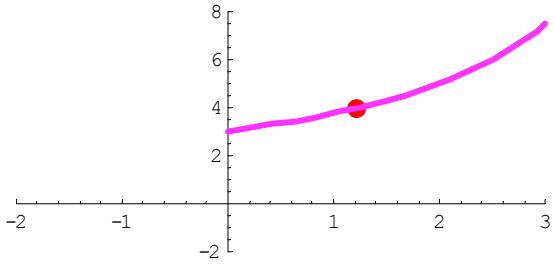

Out[10]= - Graphics -

**In[11]:=**
```
graf = Plot[15/(5 - x), {x, 0, 5}, Background → GrayLevel[0.88],
  PlotStyle → {RGBColor[1, 0.2, 1], Thickness[0.015]},
  AxesLabel → {"x", "y"}, PlotLabel → "y = 15/(5 - x) "]
```



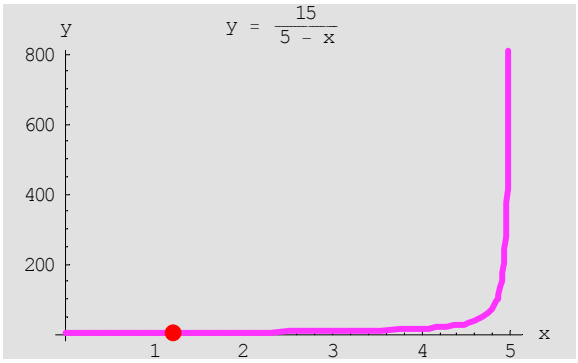

Out[11]= - Graphics -

**In[12]:=**
```
Show[bod2, graf]
```



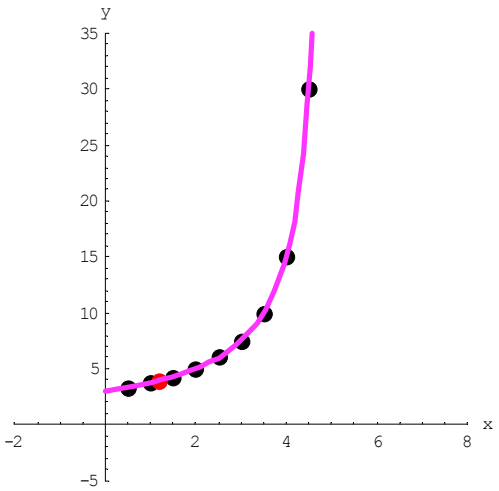

Out[12]= - Graphics -

**In[13]:=**
```
Show[graf, bod2]
```



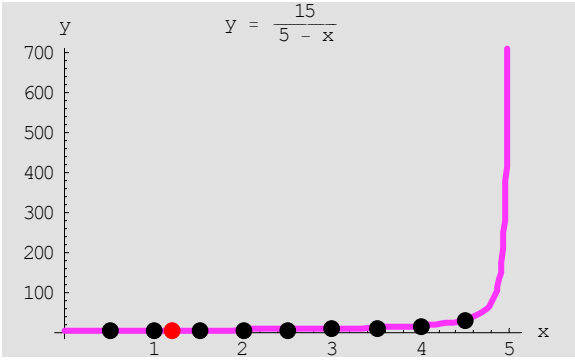

Out[13]= - Graphics -

**In[14]:=** `Show[body, bod2, graf]`




Out[14]= - Graphics -

**In[15]:=** `Show[graf, bod2, body]`




Out[15]= - Graphics -

Zadanie 4: Úlohy na riešenie

a) Určte, pre ktoré reálne čísla x je funkcia $y=\frac{1}{3x+2}$ definovaná. Zostavte tabuľku pre $-5 \le x \le +2$, keď x je celé číslo.[17]

b) Zostrojte graf funkcie u: $y=\frac{3x-2}{4}$.

**Využitie vo výučbe matematiky SŠ: lineárna funkcia, lineárna lomená funkcia, niektoré ich vlastnosti**

**Zdrojový súbor na CD-R:** Praktikum-05.nb

[17] Por. DUDRA F., *Zbierka riešených úloh z algebry,* ALFA Bratislava 1978, s. 323.