### Seminar

# 'Typ 1 Aufgaben qualitätsvoll erstellen'



Konzett, Weberndorfer

LATEX in der Schule

Oktober 2019 2 / 41



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LATEX in der Schule

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## Bilder können über folgenden Befehl eingebettet werden:

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#### \includegraphics[width=0.5\textwidth]{Grafik.jpg}

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\includegraphics[width=0.5\textwidth]{Grafik.jpg}

Wichtig:

Die Bilder müssen in dem selben Ordner liegen wie die .tex-Datei (oder der Dateipfad muss angegeben werden)

• Mit 
$$PT_EX \Rightarrow PDF$$
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# • Mit $\mathbb{A}T_{E}X \Rightarrow \mathsf{PDF}$ :

Einfügen von Standard-Grafikformaten möglich

(.jpg, .png, .pdf, ...)

• Mit 
$$\mathbb{E}_{\mathsf{E}} X \Rightarrow \mathsf{PDF}$$
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Einfügen von Standard-Grafikformaten möglich

- (.jpg, .png, .pdf, ...)
- ABER: Kein Einbetten von Geogebra-Grafiken möglich

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Einfügen von Standard-Grafikformaten möglich

(.jpg, .png, .pdf, ...)

- ABER: Kein Einbetten von Geogebra-Grafiken möglich
- Mit  $\mathbb{P}T_{E}X \Rightarrow \mathsf{PS} \Rightarrow \mathsf{PDF}$  (Standardeinstellung):

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Einbetten von Geogebra-Grafiken möglich

• ABER: Bilder müssen in das .eps Format konvertiert werden! (z.B. mit LAMA)

### LaMA kann .jpg und .png zu .eps konvertieren

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			-			FA 2.2	

🔓 LaMA - LaTeX Mathematik Assistent

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Erstellen von GeoGebra Grafiken

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### Grafik in GeoGebra erstellen (GeoGebra 5)

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- Grafik in GeoGebra erstellen (GeoGebra 5)
- Grafik als PSTricks exportieren:
  - Datei Export Grafik-Ansicht als PSTricks ...

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  - Datei Export Grafik-Ansicht als PSTricks ...
- ev. Bildgröße anpassen und Erzeuge PSTricks

- Grafik in GeoGebra erstellen (GeoGebra 5)
- Grafik als PSTricks exportieren:

Datei - Export - Grafik-Ansicht als PSTricks . . .

- ev. Bildgröße anpassen und Erzeuge PSTricks
- Code zwischen

\begin{document} ... \end{document}
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X Einheiten (cm)	Einheiten (cm)		Bildbreite	7.0					
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x Min	-3.5		x Max	3.5	3.5				
y Min	-2.5		y Max	4.5					
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Erstellen von GeoGebra Grafiken

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Erstellen von GeoGebra Grafiken

 Image: Non-State
 ```
\psset{xunit=1.0cm,vunit=1.0cm,algebraic=true,dimen=middle,dotstyle=0,dotsize=5pt
         0.linewidth=1.6pt.arrowsize=3pt 2.arrowinset=0.25}
   \begin{pspicture*}(-3.8,-2.5)(3.8,4.8)
2
   \mathbb{D} = \{0, -2\}  (0,1.0) {8}{ \psline[linestyle=dashed, linecap=1, dash=1.5pt 1.5pt,
        linewidth = 0.4 pt, linecolor = gray ] {c-c} (-3.8,0) (3.8,0) }
4
   \operatorname{lines}(-3,0)(1.0,0) {8}{\psline[linestyle=dashed,linecap=1,dash=1.5pt,
        linewidth=0.4pt,linecolor=gray]{c-c}(0,-2.5)(0,4.8)}
  \psaxes[labelFontSize=\scriptstyle,xAxis=true,yAxis=true,Dx=1.,Dy=1.,ticksize=-2
5
        pt 0, subticks = 2] {->}(0,0) (-3.8,-2.5) (3.8,4.8) [x,140] [y,-40]
   psplot [linewidth=0.8pt, plotpoints=200] {-3.5}{3.5}{x^(2.0) - 2.0}
6
7
   psplot[linewidth=0.8pt]{-3.5}{3.5}{(--12.77--1.94*x)/4.44}
   \begin{scriptsize}
8
  \rput[b1](-2.38,4.36){$f$}
9
10 \rput [b1] (-3.54,1.06) {$g$}
11 \end{scriptsize}
12 \end{pspicture*}
```

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Erstellen von GeoGebra Grafiken

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```
\psset{xunit=1.0cm,yunit=1.0cm,algebraic=true,dimen=middle,dotstyle=0,dotsize=5pt
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   \mathbb{D} \left(0, -2\right) (0, 1.0) \left\{8\right\} \left( \mathbb{D} \left(1 - 1\right) \right) 
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Erstellen von GeoGebra Grafiken

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   psplot [linewidth=0.8pt, plotpoints=200] {-3.5} {3.5} {x^(2.0) - 2.0}
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5
         pt 0, subticks = 2] {->}(0,0) (-3.8,-2.5) (3.8,4.8) [x,140] [y,-40]
   psplot [linewidth=0.8pt, plotpoints=200] {-3.5} {3.5} {x^(2.0)+1.0}
6
7
   psplot[linewidth=0.8pt]{-3.5}{3.5}{(--12.77--1.94*x)/4.44}
   \begin{scriptsize}
8
  \rput[b1](-2.38,4.36){$f$}
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Erstellen von GeoGebra Grafiken

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Erstellen von GeoGebra Grafiken

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#### GeoGebra Grafiken – Größe verändern

```
\psset{xunit=1.0cm, vunit=1.0cm, algebraic=true, dimen=middle, dotstyle=0, dotsize=5pt
          0.linewidth=1.6pt.arrowsize=3pt 2.arrowinset=0.25}
   \begin{pspicture *}(-3.8, -2.5) (3.8, 4.8)
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   \operatorname{linestyle}(0, -2)(0, 1.0) {8}{ \psline[linestyle=dashed, linecap=1, dash=1.5pt, 1.5pt,
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         linewidth = 0.4 pt, linecolor = gray ] {c-c} (0, -2.5) (0, 4.8) }
5
   \psaxes[labelFontSize=\scriptstyle,xAxis=true,yAxis=true,showorigin=false,Dx=1.,
         Dv=1, ticksize=-2pt 0, subticks=2]{->}(0,0)(-3,8,-2,5)(3,8,4,8)[x,140] [v]
         .-401
   psplot[linewidth=0.8pt, plotpoints=200]{-3.5}{3.5}{x^{(2.0)+1.0}}
6
   psplot [linewidth=0.8pt] \{-3,5\} \{3,5\} \{(-12,77-1,94*x)/4,44\}
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```

#### GeoGebra Grafiken – Größe verändern

```
\psset{xunit=0.5cm, vunit=0.5cm, algebraic=true, dimen=middle, dotstyle=0, dotsize=5pt
          0.linewidth=1.6pt.arrowsize=3pt 2.arrowinset=0.25}
   \begin{pspicture *}(-3.8, -2.5) (3.8, 4.8)
2
   \operatorname{linestyle}(0, -2)(0, 1.0) {8}{ \psline[linestyle=dashed, linecap=1, dash=1.5pt, 1.5pt,
         linewidth = 0.4 pt, linecolor = gray ] {c-c} (-3.8,0) (3.8,0) }
   \operatorname{lines}(-3,0)(1.0,0) {8}{\psline[linestyle=dashed,linecap=1,dash=1.5pt,
         linewidth = 0.4 pt, linecolor = gray ] {c-c} (0, -2.5) (0, 4.8) }
5
   \psaxes[labelFontSize=\scriptstyle,xAxis=true,yAxis=true,showorigin=false,Dx=1.,
         Dv=1, ticksize=-2pt 0, subticks=2]{->}(0,0)(-3,8,-2,5)(3,8,4,8)[x,140] [v]
         .-401
   psplot[linewidth=0.8pt, plotpoints=200]{-3.5}{3.5}{x^{(2.0)+1.0}}
6
   psplot [linewidth=0.8pt] \{-3,5\} \{3,5\} \{(-12,77-1,94*x)/4,44\}
   \begin{scriptsize}
8
9 \rput [b1] (-2.38,4.36) {$f$}
10 \rput [b1] (-3.54,1.06) {$g$}
11 \end{scriptsize}
   \end{pspicture*}
12
```

### xunit=1.0cm,yunit=1.0cm



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#### xunit=0.5cm,yunit=0.5cm



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#### GeoGebra Grafiken – Beschriftung ändern

```
\psset{xunit=0.5cm,vunit=0.5cm,algebraic=true,dimen=middle,dotstyle=0,dotsize=5pt
          0.linewidth=1.6pt.arrowsize=3pt 2.arrowinset=0.25}
   \begin{pspicture *}(-3.8, -2.5) (3.8, 4.8)
2
   \operatorname{linestyle}(0, -2)(0, 1.0) {8}{ \psline[linestyle=dashed, linecap=1, dash=1.5pt, 1.5pt,
         linewidth = 0.4 pt, linecolor = gray ] {c-c} (-3.8,0) (3.8,0) }
4
   \operatorname{lines}(-3,0)(1.0,0) {8}{\psline[linestyle=dashed,linecap=1,dash=1.5pt,
         linewidth = 0.4 pt, linecolor = gray ] {c-c} (0, -2.5) (0, 4.8) }
5
   \psaxes[labelFontSize=\scriptstyle,xAxis=true,yAxis=true,showorigin=false,Dx=1.,
         Dv=1, ticksize=-2pt 0, subticks=2]{->}(0,0)(-3,8,-2,5)(3,8,4,8)[x,140] [v]
         .-401
   psplot[linewidth=0.8pt, plotpoints=200]{-3.5}{3.5}{x^{(2.0)+1.0}}
6
   \psplot[linewidth=0.8pt]{-3.5}{3.5}{(--12.77--1.94*x)/4.44}
   \begin{scriptsize}
8
   \rput[b1](-2.38,4.36){$f$}
9
10 \rput [b1] (-3.54,1.06) {$g$}
11 \end{scriptsize}
   \end{pspicture*}
12
```

#### GeoGebra Grafiken – Beschriftung ändern

```
\psset{xunit=0.5cm,vunit=0.5cm,algebraic=true,dimen=middle,dotstyle=0,dotsize=5pt
          0.linewidth=1.6pt.arrowsize=3pt 2.arrowinset=0.25}
   \begin{pspicture *}(-3.8, -2.5) (3.8, 4.8)
2
   \operatorname{linestyle}(0, -2)(0, 1.0) {8}{ \psline[linestyle=dashed, linecap=1, dash=1.5pt, 1.5pt,
         linewidth = 0.4 pt, linecolor = gray ] {c-c} (-3.8,0) (3.8,0) }
4
   \operatorname{lines}(-3,0)(1.0,0) {8}{\psline[linestyle=dashed,linecap=1,dash=1.5pt,
         linewidth = 0.4 pt, linecolor = gray ] {c-c} (0, -2.5) (0, 4.8) }
5
   \psaxes[labelFontSize=\scriptstyle,xAxis=true,yAxis=true,showorigin=false,Dx=1.,
         Dv=1, ticksize=-2pt 0, subticks=2]{->}(0,0)(-3,8,-2,5)(3,8,4,8)[x,140] [v]
         .-401
   psplot[linewidth=0.8pt, plotpoints=200]{-3.5}{3.5}{x^{(2.0)+1.0}}
6
   psplot [linewidth=0.8pt] \{-3,5\} \{3,5\} \{(-12,77-1,94*x)/4,44\}
   \begin{scriptsize}
8
   \rput[b1](-2.38,4.36){$k$}
9
10 \rput [b1] (-3.54,1.06) {$t$}
11
  \end{scriptsize}
   \end{pspicture*}
12
```

### Beschriftung ändern



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#### GeoGebra Grafiken – Beschriftung verschieben

```
\psset{xunit=0.5cm,vunit=0.5cm,algebraic=true,dimen=middle,dotstyle=0,dotsize=5pt
          0.linewidth=1.6pt.arrowsize=3pt 2.arrowinset=0.25}
   \begin{pspicture *}(-3.8, -2.5) (3.8, 4.8)
2
   \operatorname{linestyle}(0, -2)(0, 1.0) {8}{ \psline[linestyle=dashed, linecap=1, dash=1.5pt, 1.5pt,
         linewidth = 0.4 pt, linecolor = gray ] {c-c} (-3.8,0) (3.8,0) }
4
   \operatorname{lines}(-3,0)(1.0,0) {8}{\psline[linestyle=dashed,linecap=1,dash=1.5pt,
         linewidth = 0.4 pt, linecolor = gray ] {c-c} (0, -2.5) (0, 4.8) }
   \psaxes[labelFontSize=\scriptstyle,xAxis=true,yAxis=true,showorigin=false,Dx=1.,
5
         Dv=1, ticksize=-2pt 0, subticks=2]{->}(0,0)(-3,8,-2,5)(3,8,4,8)[x,140] [v]
         .-401
   psplot[linewidth=0.8pt, plotpoints=200]{-3.5}{3.5}{x^{(2.0)+1.0}}
6
   psplot [linewidth=0.8pt] \{-3,5\} \{3,5\} \{(-12,77-1,94*x)/4,44\}
   \begin{scriptsize}
8
   \rput[b1](-2.38,4.36){$k$}
9
10 \rput [b1] (-3.54,1.06) {$t$}
  \end{scriptsize}
11
   \end{pspicture*}
12
```

#### GeoGebra Grafiken – Beschriftung verschieben

```
\psset{xunit=0.5cm,vunit=0.5cm,algebraic=true,dimen=middle,dotstyle=0,dotsize=5pt
          0.linewidth=1.6pt.arrowsize=3pt 2.arrowinset=0.25}
   \begin{pspicture *}(-3.8, -2.5) (3.8, 4.8)
2
   \operatorname{linestyle}(0, -2)(0, 1.0) {8}{ \psline[linestyle=dashed, linecap=1, dash=1.5pt, 1.5pt,
         linewidth = 0.4 pt, linecolor = gray ] {c-c} (-3.8,0) (3.8,0) }
4
   \operatorname{lines}(-3,0)(1.0,0) {8}{\psline[linestyle=dashed,linecap=1,dash=1.5pt,
         linewidth = 0.4 pt, linecolor = gray ] {c-c} (0, -2.5) (0, 4.8) }
   \psaxes[labelFontSize=\scriptstyle,xAxis=true,yAxis=true,showorigin=false,Dx=1.,
5
         Dv=1, ticksize=-2pt 0, subticks=2]{->}(0,0)(-3,8,-2,5)(3,8,4,8)[x,140] [v]
         .-401
   psplot[linewidth=0.8pt, plotpoints=200]{-3.5}{3.5}{x^{(2.0)+1.0}}
6
   \psplot[linewidth=0.8pt]{-3.5}{3.5}{(--12.77--1.94*x)/4.44}
   \begin{scriptsize}
8
   \rput[b1](-2.38,4.36){$k$}
9
10 \rput [b1] (-3.54,0.9) {$t$}
11
  \end{scriptsize}
   \end{pspicture*}
12
```

### Beschriftung verschieben



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```
1 \psset{xunit=1.0cm,yunit=1.0cm,algebraic=true,dimen=middle,
      dotstyle=o,dotsize=5pt 0,linewidth=1.6pt,arrowsize=3pt 2,
      arrowinset =0.25}
 \begin{pspicture *}(-4.,-4.)(4.,4.)
 multips (0,-4) (0,1.0) {9} {\rm psline [linestyle=dashed,linecap=1,]}
      dash=1.5pt 1.5pt,linewidth=0.4pt,linecolor=gray]{c-c
     \{(-4.,0)(4.,0)\}
 multips(-4,0)(1.0,0){9}{\psline[linestyle=dashed,linecap=1,]}
      dash=1.5pt 1.5pt,linewidth=0.4pt,linecolor=gray]{c-c
     \{(0, -4, ), (0, 4, )\}
 \psaxes[labelFontSize=\scriptstyle,xAxis=true,yAxis=true,Dx
      =1., Dy=1., ticksize=-2pt 0, subticks=2]{->}(0,0)(-4.,-4.)
      (4..4.)
 \psplot[linewidth=0.8pt,linecolor=red,plotpoints
      =200 { -4.0 { 4.0 { 4.0 { -x^{(2.0)}} + 3.0 }
  \end{pspicture*}
```

```
1 \psset{xunit=1.0cm,yunit=1.0cm,algebraic=true,dimen=middle,
      dotstyle=o,dotsize=5pt 0,linewidth=1.6pt,arrowsize=3pt 2,
      arrowinset =0.25}
 \begin{pspicture *}(-4.,-4.)(4.,4.)
 multips (0,-4) (0,1.0) {9} {\rm psline [linestyle=dashed,linecap=1,]}
      dash=1.5pt 1.5pt,linewidth=0.4pt,linecolor=gray]{c-c
     \{(-4.,0)(4.,0)\}
 multips(-4,0)(1.0,0){9}{\psline[linestyle=dashed,linecap=1,]}
      dash=1.5pt 1.5pt,linewidth=0.4pt,linecolor=gray]{c-c
     \{(0, -4, ), (0, 4, )\}
 \psaxes[labelFontSize=\scriptstyle,xAxis=true,yAxis=true,Dx
      =1., Dy=1., ticksize=-2pt 0, subticks=2]{->}(0,0)(-4.,-4.)
      (4..4.)
 \psplot[linewidth=0.8pt,linecolor=red,plotpoints
      =200 { -4.0 { 4.0 { 4.0 { -x^{(2.0)}} + 3.0 }
  \end{pspicture*}
```

```
1 \psset{xunit=1.0cm,yunit=1.0cm,algebraic=true,dimen=middle,
      dotstyle=0,dotsize=5pt 0,linewidth=1.6pt,arrowsize=3pt 2,
      arrowinset =0.25}
 \begin{pspicture *}(-4.,-4.)(4.,4.)
 multips (0,-4) (0,1.0) {9} {\rm psline [linestyle=dashed,linecap=1,]}
      dash=1.5pt 1.5pt,linewidth=0.4pt,linecolor=gray]{c-c
     \{(-4.,0)(4.,0)\}
 multips(-4,0)(1.0,0){9}{\psline[linestyle=dashed,linecap=1,]}
      dash=1.5pt 1.5pt,linewidth=0.4pt,linecolor=gray]{c-c
     \{(0, -4, ), (0, 4, )\}
 \psaxes[labelFontSize=\scriptstyle,xAxis=true,yAxis=true,Dx
      =1., Dy=1., ticksize=-2pt 0, subticks=2]{->}(0,0)(-4.,-4.)
      (4..4.)
6 \antwort {\psplot [linewidth = 0.8pt, linecolor = red, plotpoints
      =200 { -4.0 { 4.0 { -x^{(2.0)}} + 3.0 }
  \end{pspicture*}
```

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# solution\_off



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### solution\_on



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### Hilfe zur Erstellung unbekannter Funktionen – Geogebra

TrendPoly(Liste von Punkten, Grad des Polynoms)
 Bsp: TrendPoly({A,B,C,D},3)

TrendPoly(Liste von Punkten, Grad des Polynoms)
 Bsp: TrendPoly({A,B,C,D},3)

TrendPoly(Freihand Funktion, Grad des Polynoms)
 Bsp: TrendPoly(f, 4)

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