

Term visualisieren

Prof. Dr. Dörte Haftendorn: Mathematik mit MuPAD 4, Apr.10 Update 29.4.10

www.mathematik-verstehen.de

<http://haftendorn.uni-lueneburg.de>

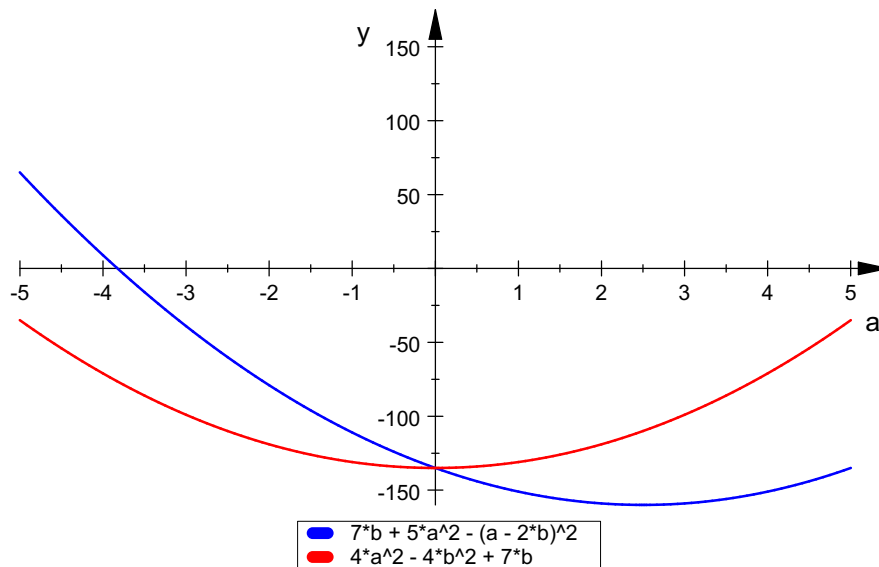
#####

Visuelle Termprüfungen

```
term:=5*a^2+7*b-(a-2*b)^2
```

$$7 \cdot b + 5 \cdot a^2 - (a - 2 \cdot b)^2$$

```
plotfunc2d(term,term2,a=-5..5,b=-5..5)
```



```
term2:=4*a^2+7*b-4*b^2
```

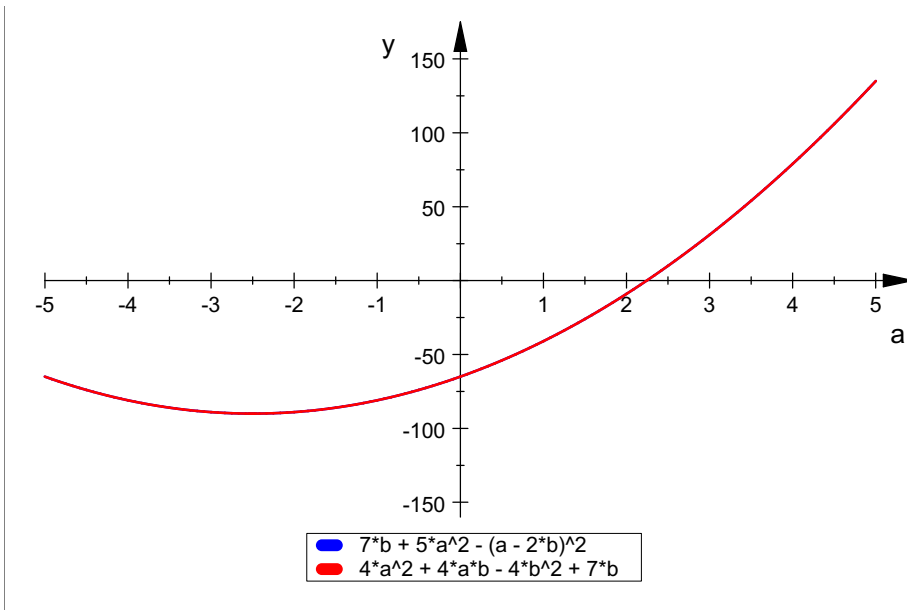
$$4 \cdot a^2 - 4 \cdot b^2 + 7 \cdot b$$

```
term3:=expand(term)
```

$$4 \cdot a^2 + 4 \cdot a \cdot b - 4 \cdot b^2 + 7 \cdot b$$

```
plotfunc2d(term,term3,a=-5..5,b=-5..5)
```

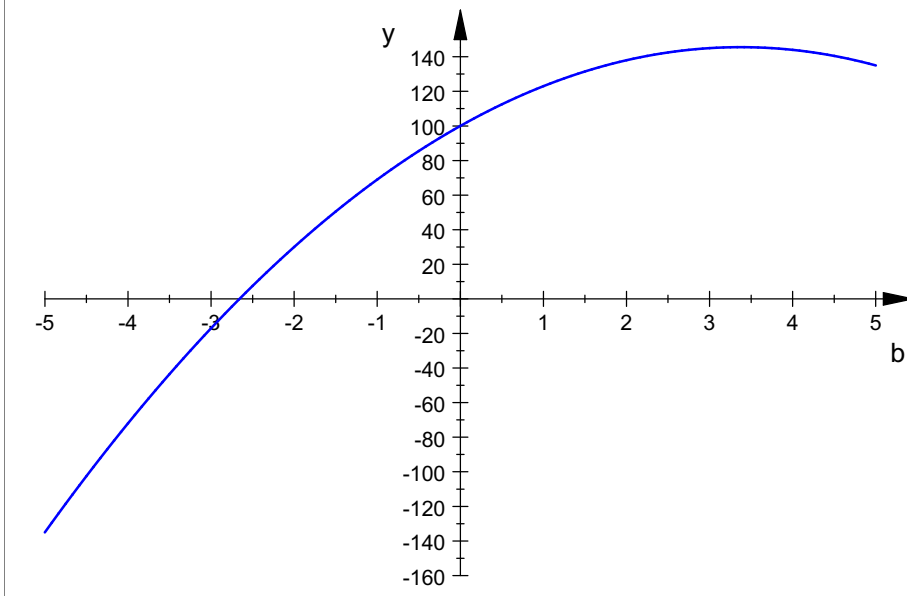




`expand((a-2*b)^2)`

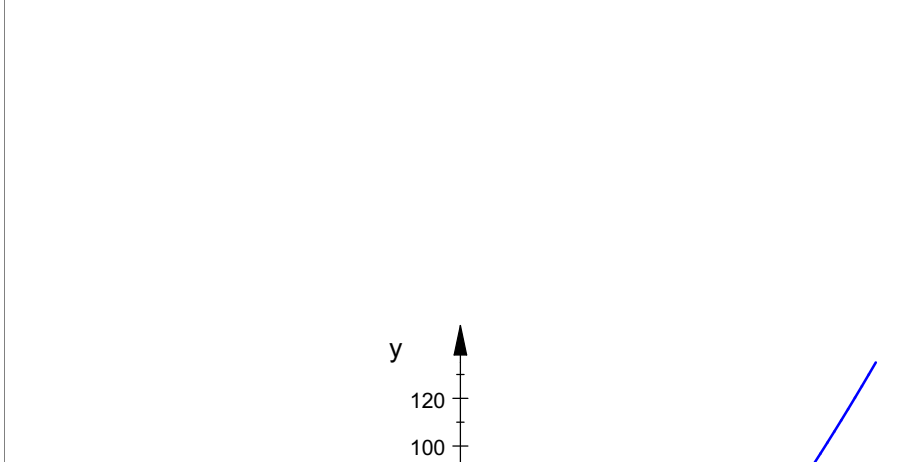
$$a^2 - 4 \cdot a \cdot b + 4 \cdot b^2$$

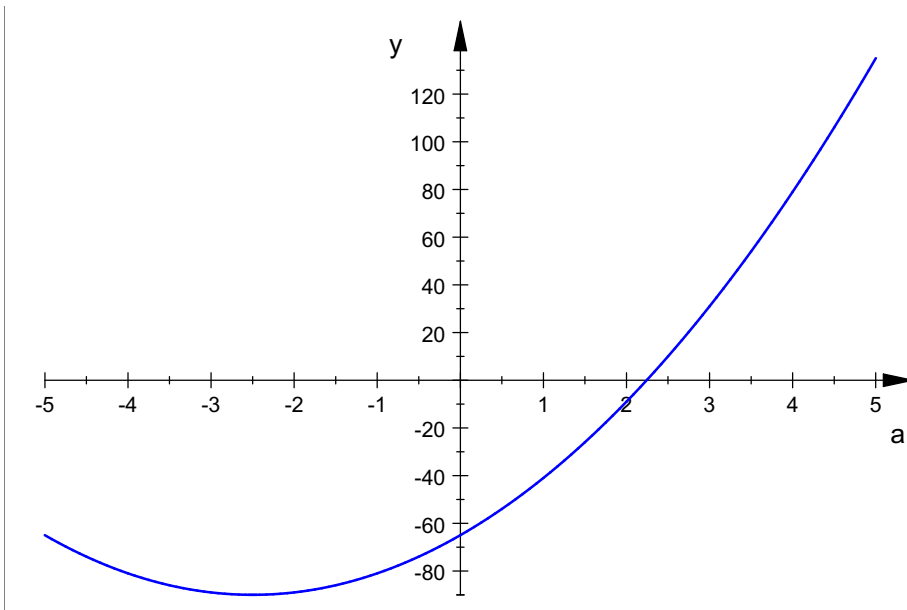
`plotfunc2d(term, b=-5..5, a=-5..5)`



Rechnerische Lösungen visualisiert

`plotfunc2d(term, a=-5..5, b=5..5)`





```
lob:=solve(term=0,a)
```

$$\left\{ -\frac{b}{2} - \frac{\sqrt{b \cdot (5 \cdot b - 7)}}{2}, \frac{\sqrt{b \cdot (5 \cdot b - 7)}}{2} - \frac{b}{2} \right\}$$

```
lob|b=5
```

$$\left\{ -\frac{\sqrt{90}}{2} - \frac{5}{2}, \frac{\sqrt{90}}{2} - \frac{5}{2} \right\}$$

```
float(%)
```

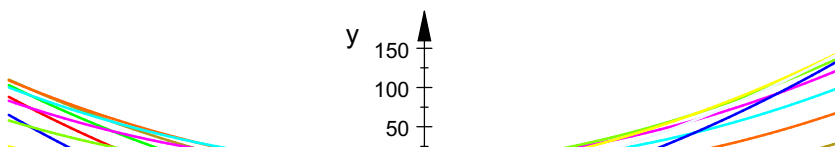
$$\{-7.24341649, 2.24341649\}$$

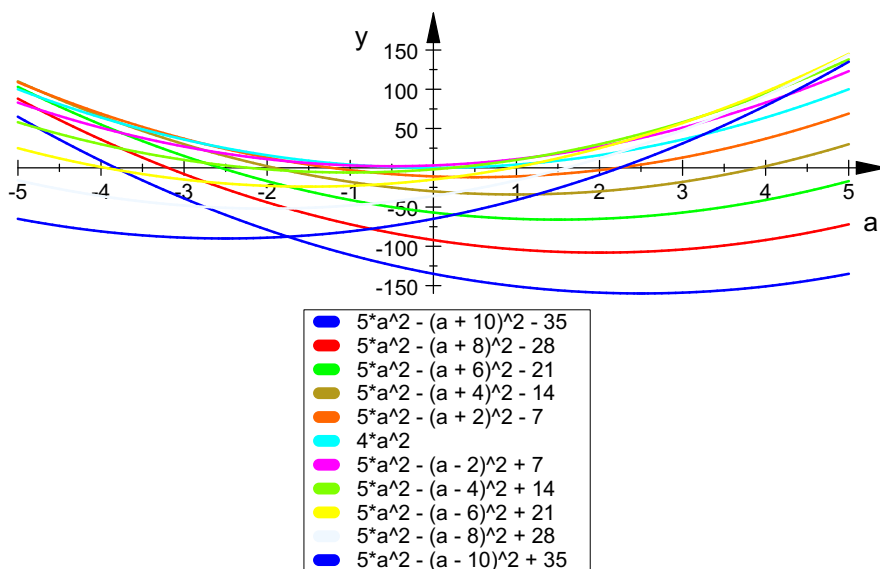
Funktionsscharenansicht

```
alleTerme:=term $ b=-5..5
```

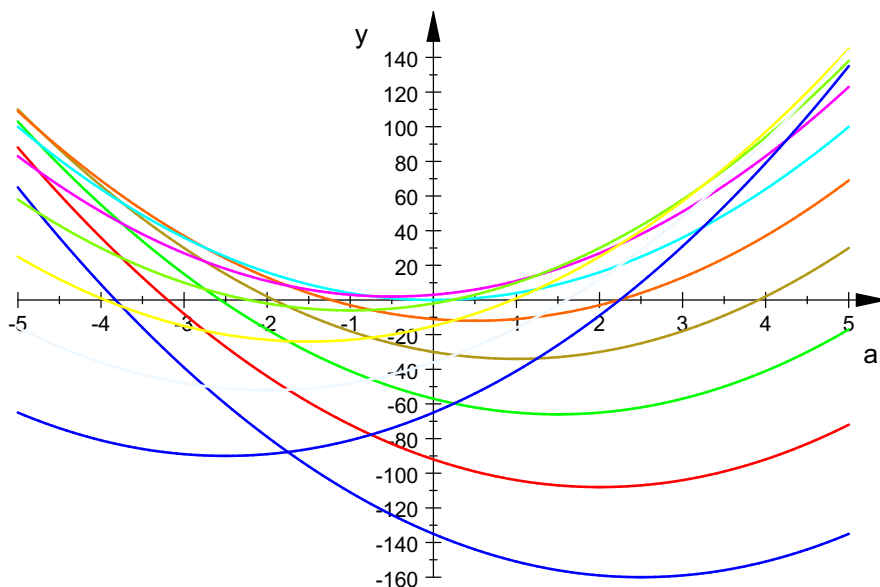
$$5 \cdot a^2 - (a + 10)^2 - 35, 5 \cdot a^2 - (a + 8)^2 - 28, 5 \cdot a^2 - (a + 6)^2 - 21, 5 \cdot a^2 - (a + 4)^2 - 14, 5 \cdot a^2 - (a + 2)^2 - 7$$

```
plotfunc2d(alleTerme)
```





```
plotfunc2d(alleTerme, LegendVisible=FALSE)
```



```
loa:=float(solve(term=0,b))
```

$$\left\{ 0.5 \cdot a - 0.125 \cdot \sqrt{80.0 \cdot a^2 + 56.0 \cdot a + 49.0} + 0.875, 0.5 \cdot a + 0.125 \cdot \sqrt{80.0 \cdot a^2 + 56.0 \cdot a + 49.0} \right\}$$

```
nst:=loa $ a=-5..5
```

$$\{-6.882435211, 3.632435211\}, \{-5.280192535, 3.030192535\}, \{-3.689412668, 2.439412668\}$$

```
output::tableForm({nst})
```

$\{-0.3251838136, 3.075183814\}$	$\{-0.6930004682, 1.443000468\}$
$\{-0.8664640249, 4.616464025\}$	$\{-1.451306966, 6.201306966\}$
$\{-2.051015124, 7.801015124\}$	$\{-2.128902443, 1.878902443\}$
$\{-2.657464256, 9.407464256\}$	$\{-3.689412668, 2.439412668\}$
$\{-5.280192535, 3.030192535\}$	$\{-6.882435211, 3.632435211\}$

```
{-5.280192535, 3.030192535} {-6.882435211, 3.632435211}  
{0.0, 1.75}
```

```
output::tableForm( {expand(term) $ b=-5..5})
```

```
4*a^2          4*a^2 + 12*a - 15  4*a^2 + 16*a - 36  
4*a^2 + 20*a - 65  
4*a^2 + 4*a + 3    4*a^2 + 8*a - 2    4*a^2 - 12*a - 57  
4*a^2 - 16*a - 92  
4*a^2 - 20*a - 135 4*a^2 - 4*a - 11    4*a^2 - 8*a - 30
```