Lösungen Test 1 B1

1

a

I = (-4, Infinity)

b

I = { }

c

Kein Plot möglich (Plot[Sqrt[5-x],{x,...,... }];)

2

```
(b^(Sqrt[8])/b^(Sqrt[2]))^(Sqrt[2]/Sqrt[3])+Log[Log[E^b]]+Log[Log[E^(2
b)]]//PowerExpand
```

$b^{\frac{2}{\sqrt{3}}} + \text{Log}[2] + 2\,\text{Log}[b]$

Resultat:

$b^{\frac{2}{\sqrt{3}}} + \text{Log}[2] + 2\,\text{Log}[b]$

3

a

```
Solve[25x^2+4 b x+16==0,{x}] //Flatten
```

$\left\{ x \to \frac{2}{25}\,\left(-b - \sqrt{-100 + b^2}\right),\ x \to \frac{2}{25}\,\left(-b + \sqrt{-100 + b^2}\right) \right\}$

```
Solve[-100 + b^2==0,{b}] //Flatten
```

$\{b \to -10, b \to 10\}$

b

```
Solve[Sqrt[x^4+9]==x^2+1,{x}] //Flatten
```

$\{x \to -2, x \to 2\}$

```
25x^2+4 b x+16/.{b->10,x->2}
```

196

```
25x^2+4 b x+16/.{b->10,x->-2}
```

36

```
25x^2+4 b x+16/.{b->-10,x->2}
```

36

```
25x^2+4 b x+16/.{b->-10,x->-2}
```

196

4

Automatische Lösung

```
g1=(2 x1+x2==1*7);
g2=(3 x2+x3==4*7);
g3=( x3-x4==3*7);
g4=(x4+x1 Sign[x1]==0);
Solve[{g1,g2,g3,g4},{x1,x2,x3,x4}] //Flatten
```

$\{x2 \to 3, x3 \to 19, x4 \to -2, x1 \to 2\}$

Lösung für positive x1

```
g4=(x4+x1==0);
Solve[{g1,g2,g3,g4},{x1,x2,x3,x4}] //Flatten
```

$\{x1 \to 2, x2 \to 3, x3 \to 19, x4 \to -2\}$

Lösung für negative x1

Falls x1 < 0: Keine Lösung, da x1 > 0 herauskommt!

```
g4=(x4-x1==0);
Solve[{g1,g2,g3,g4},{x1,x2,x3,x4}] //Flatten
```

$$\left\{x1 \rightarrow \frac{14}{5},\ x2 \rightarrow \frac{7}{5},\ x3 \rightarrow \frac{119}{5},\ x4 \rightarrow \frac{14}{5}\right\}$$

5

Lösung

```
Solve[((x-1)^2)/4+((x-1-1)^2)/9==1,{x}] //Flatten
```

$$\left\{x \rightarrow \frac{1}{13}\left(17 - 12\sqrt{3}\right),\ x \rightarrow \frac{1}{13}\left(17 + 12\sqrt{3}\right)\right\}$$

```
solv=Solve[((x-1)^2)/4+((x-1-1)^2)/9==1,{x}]//N  //Flatten
```

$$\{x \rightarrow -0.291124,\ x \rightarrow 2.90651\}$$

Graphik

```
x1=x/.solv[[1]];x2=x/.solv[[2]]; {x1,x2}
```

$$\{-0.291124,\ 2.90651\}$$

```
<< Graphics`ImplicitPlot`
```

```
p1=ImplicitPlot[(x-1)^2 /4 + (y-1)^2 / 9
==1,{x,-1,3},AspectRatio->Automatic,DisplayFunction↦Identity];
```

```
g[x_]:=0+(x-1)
```

```
p2=Plot[g[x],{x,-1,3},Epilog->{PointSize[0.03],Point[{x1,g[x1]}],Point[{x2,g[x2]}]}
,AspectRatio->Automatic,DisplayFunction↦Identity];
```

Show[p2,p1,DisplayFunction:→$DisplayFunction];
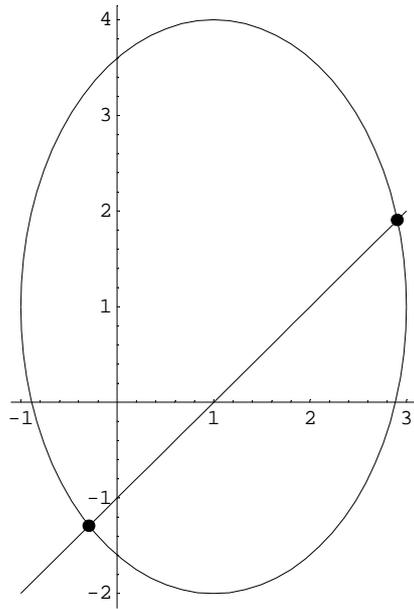

6

a

Plot[(3x+2)/(x+1),{x,-4,4}];
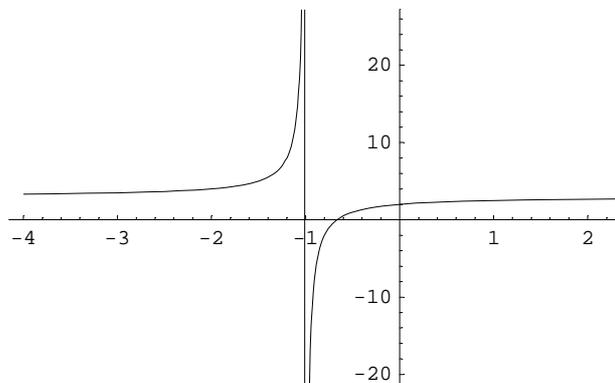
Keine der Eigenschaften

b

```
Plot[-E^{-x}+4+Cos[x],{x,-5,15}];
```
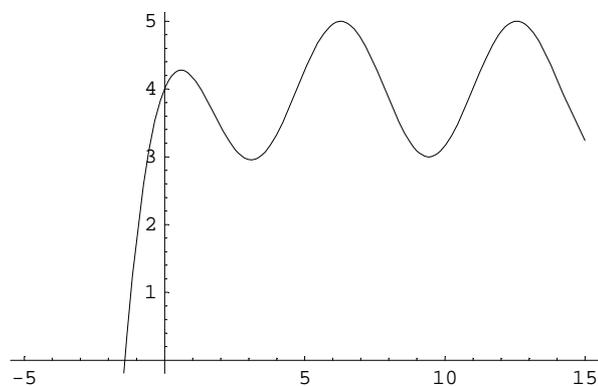

Keine der Eigenschaften

c

```
Plot[x Sqrt[x^2+16],{x,-10,10}];
```
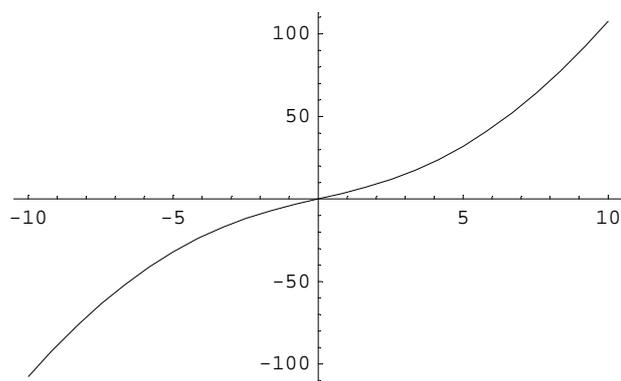

Ungerade

7

```
Limit[(2n^2+3n+1)/(5n^2),{n->Infinity}]
```

$\left\{ \dfrac{2}{5} \right\}$