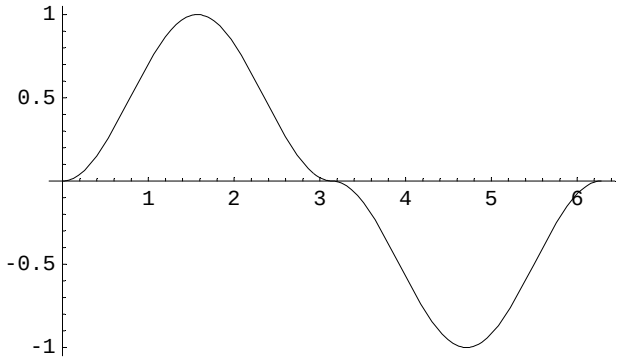
# Lösungen

## 1 Skizzen

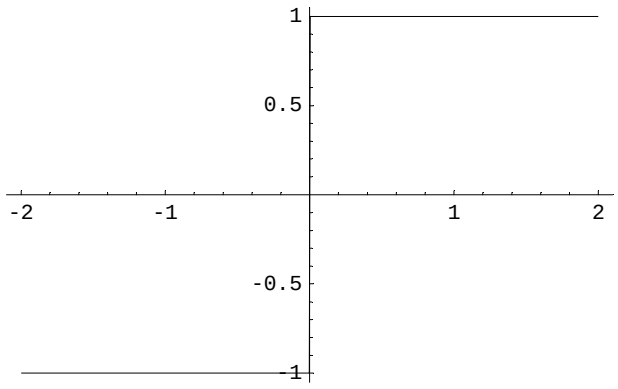
### a, f1

```
Plot[{Sin[x] Sqrt[1-Cos[x]^2]},{x,0,2Pi}];
```




### b, f2

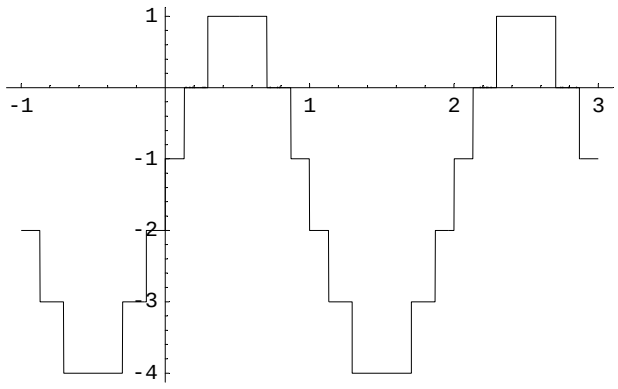
```
Plot[x/Sqrt[x^2]  (1-0^(Sqrt[x^2])),{x,-2,2}] ;
```




x nicht 0

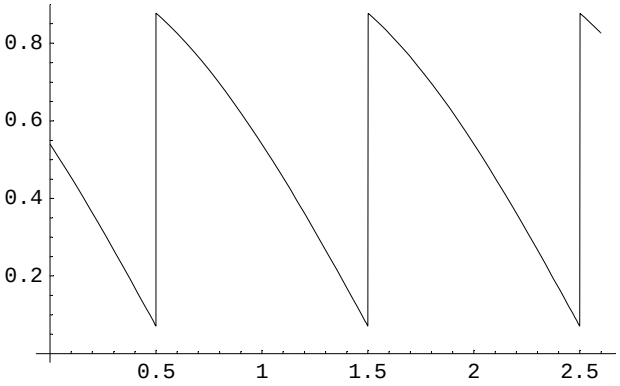
## c, f3

```
Plot[Floor[2.5 Sin[Pi x]-1],{x,-1,3},PlotPoints->70];
```

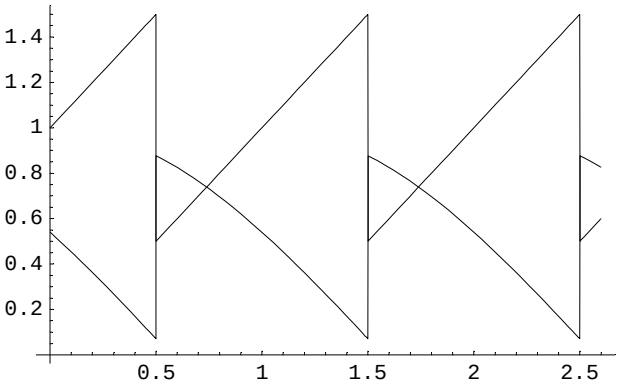



## d, f4

```
Plot[{Cos[x-Floor[x-0.5]]},{x,0,2.6},PlotPoints->70];
```

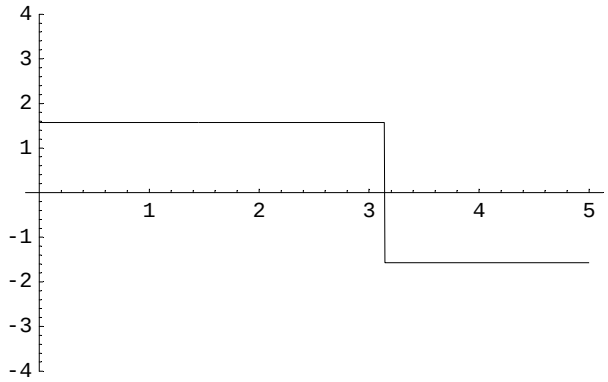



```
Plot[{x-Floor[x-0.5],Cos[x-Floor[x-0.5]]},{x,0,2.6},PlotPoints->70];
```



## e, f5

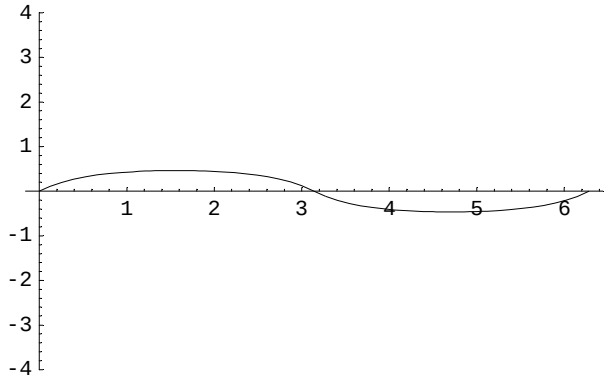
```
Plot[ArcSin[Sin[x]/Sqrt[Sin[x]^2]],{x,0,5},PlotRange->{-4,4}];
```




x nicht 0 oder

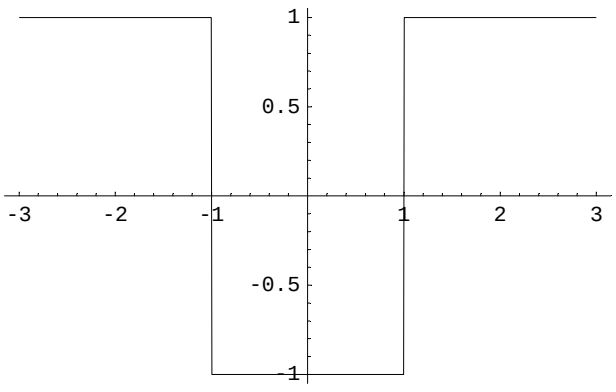
## f, f6

```
Plot[ArcTan[Sin[x]/(Sqrt[1-Cos[x]^2]+1)],{x,0,2Pi},PlotRange->{-4,4}];
```



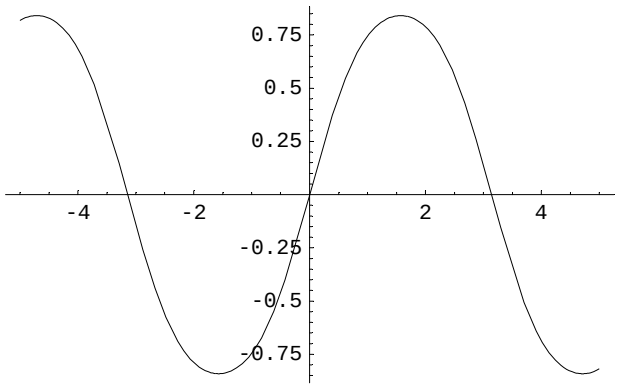

## g, f7

```
Plot[Sign[x^2-1],{x,-3,3}];
```



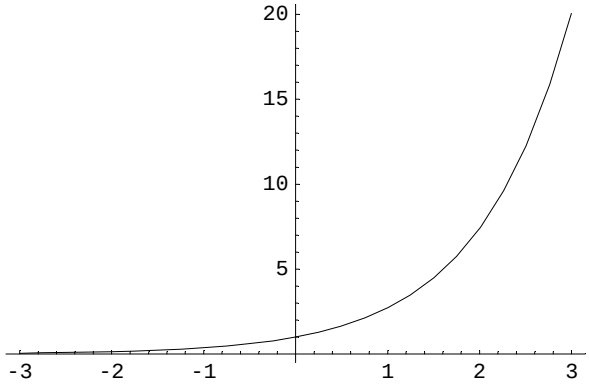
## h, f8

```
Plot[Sin[Sin[x]],{x,-5,5}];
```



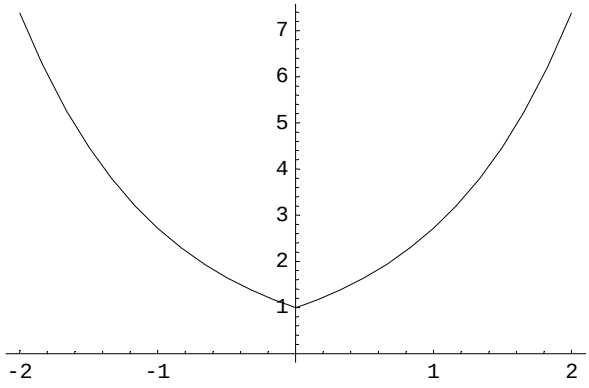

## i, f9

```
Plot[Cosh[x]+Sinh[x],{x,-3,3}];
```



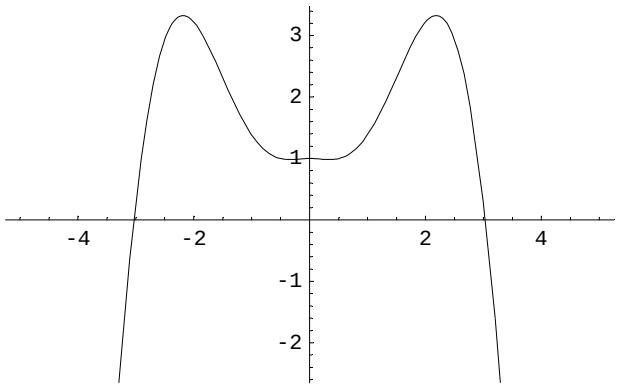

## j, f10

```
Plot[Cosh[Abs[x]]+Sinh[Abs[x]],{x,-2,2}];
```



### k, f11

```
Plot[x Abs[x] Sin[x]+Cos[x],{x,-5,5}];
```




## 2 Wo letzte Funktionen ...

**Nicht stetig: b, c, d e, g**

**Nicht monoton: a, c, d, f, g, h, j, k**

**senkrechte Asymptote resp. Pol: keine**

**gerade: a, g, j, k**

## 3 Vereinfachen

### a

```
(-x+1)/x (x+1+(x^3+1)/(x+1)/(x-1))-2x//Simplify
```

```
1 - 4 x
```

### b

```
Solve[%==3,{x}]//N
```

```
{{x → -0.5}}
```

```
Solve[-%%==3,{x}]//N
```

$$\{\{x \to 1.\}\}$$

```
(* Wo Betrag = 3? *)
```

### c

```
Solve[x-1==6+6/(x-1),{x}]
```

$$\left\{\left\{x \to 4 - \sqrt{15}\right\}, \left\{x \to 4 + \sqrt{15}\right\}\right\}$$

```
%//N
```

$$\{\{x \to 0.127017\}, \{x \to 7.87298\}\}$$

$x > 7 > 0$ ==> x ungef. 7.87298

---

## 4

```
Limit[(E^n+2n^2)/(Pi E^n+1/n),n->Infinity]
```

$$\frac{1}{\pi}$$

```
Limit[(1/n+1/n^2) Log[n^2],n->Infinity]
```

$$0$$

```
Limit[(Sin[n] n-4 n^2+n-2-3/n)/(n Sin[n]+2 n^3+2 n+1),n->Infinity]
```

$$0$$

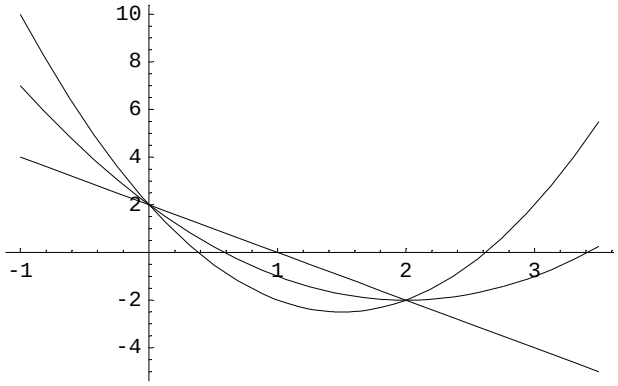
```
Limit[(Sin[n]^2 Tan[1/n^2]+1)/( Sin[n]+3 n)+(4n^2-2)/(3n^2-2),n->Infinity]
```

$$\frac{4}{3}$$

# 5

## NS, Schnittpunkt, Minima, Gerade zwischen Schnittpunkten (Sehne): Schnitt x-Achse

```
Plot[{2+x(-4/2),(x-2)^2-2,2(x-1)(x-2)-2},{x,-1,3.5}];
```




## Schnittpunkte

```
solv = Solve[(x - 2)^2 - 2 == 2 (x - 1) (x - 2) - 2, {x}]
```

```
{{x → 0}, {x → 2}}
```

```
x1=x/.solv[[1]]
```

```
0
```

```
x2=x/.solv[[2]]
```

```
2
```

```
y1=(x-2)^2-2/.solv[[1]]//N
```

```
2.
```

```
y2=(x-2)^2-2/.solv[[2]]//N
```

```
-2.
```

## Sehne geschnitten mit Achse

```
g[x_]:=2+x(-4/2)
```

```
Solve[g[x]==0,{x}]
```

```
{{x → 1}}
```