Blatt 6

Aufgabe 21

```
> restart:
> ns := seq(n, n = 2..12);
> p := (x, n) -> x^n - 1;
> for n in ns do
    solve(p(x, n) = 0, x);
  end do;
```

Aufgabe 22

```
> restart:
```

(a)

```
> Gl := 2^x - 2*sqrt(x) = 0;
> solve(Gl, x);
> # Test
> subs(x = 1/2, lhs(Gl));
> subs(x = 1, lhs(Gl));
> plot(lhs(Gl), x = 0..2);
```

(b)

```
> Gl := 4^x - 4 * x^(3/4) = 0;
> sols := solve(Gl, x);
> allvalues([ sols ]);
> #hmm
> plot(lhs(Gl), x = 0..2);
> evalf(sols);
```

(c)

```
> # Finde reele Lösungen
> map(sol -> is(evalf(sol), real), [ sols ]);
> solsReal := [ sols[1], sols[2] ];
> solsRealNumerical := map(x -> evalf(x), solsReal) ;
> # oder kürzer (aber nicht in der VL)
> solsRealNumerical := map(x -> evalf(x), select(sol -> is(evalf
  (sol), real), [ sols ]));
> # Teste analytische Nullstellen
> subs(x = 1/4, lhs(Gl));
> subs(x = 1, lhs(Gl));
```

Aufgabe 23

```
> restart:
```

(a)

```
> simplify(sin(4*x) * cos(2*x));
```

```
> simplify((1/2) * sin(6*x) + (1/2) * sin(2*x));
```

(b)

```
> f := x -> cos(4*x);
> expand(f(x));
> ?trigsubs
> gs := trigsubs(f(x));
> map(g -> simplify(expand(g)), gs);
```

(c)

```
> h := x -> sin(x) * sin(y) * sin(z);
> combine(h(x));
```

Aufgabe 24

```
> restart:
> with(plots):
> R := z -> (1 + 1/3 * z)/(1 - 2/3 * z + 1/6 * z^2);
> implicitplot(abs(exp(-x - I*y) * R(x + I * y)) = 1, x = -5..10,
  y = -5..5, numpoints = 10000, scaling = constrained);
```