Aufgabenblatt 6: Funktionen

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Aufgabe 1 – Binär- und Dezimalzahlen

```c
#include<math.h>
#include<stdio.h>

int binaryToDecimal(long int binary) {
  int decimal = 0, exponent = 0;
  while(binary > 0) {
    decimal += binary % 10 == 1 ? pow(2, exponent) : 0;
    binary /= 10;
    exponent++;
  }
  return decimal;
}

long int decimalToBinary(int decimal) {
  long int binary = 0, i = 1;
  while (decimal > 0) {
    int remainder = decimal % 2;
    decimal /= 2;
    binary = binary + remainder * i;
    i *= 10;
  }
  return binary;
}

int main() {
  long int binary = 1000011101010011;
  printf("%ld as decimal is: %d\n", binary, binaryToDecimal(binary));
  int decimal= 34643;
  printf("%d as binary is: %ld\n", decimal, decimalToBinary(decimal));
  return 0;
}
```

Aufgabe 2 – Quadratische Gleichung

```c
#include<stdio.h>
#include<math.h>

int solve(int a, int b, int c, double* x1, double* x2) {
  double inside_root = b * b - 4 * a * c;
  *x1 = (-b + sqrt(inside_root)) / (2 * a);
  *x2 = (-b - sqrt(inside_root)) / (2 * a);
  if (inside_root > 0)
    return 2;
  if (inside_root == 0)
    return 1;
  if (inside_root < 0)
    return 0;
}

int main() {
  double a, b, c;
  scanf("%lf %lf %lf", &a, &b, &c);
  double x1, x2;
  int anzahl = solve(a, b, c, &x1, &x2);
  if (!anzahl)
    printf("keine Loesung");
  else if (anzahl == 1)
    printf("eine Loesung x: %lf", x1);
  else if (anzahl > 1)
    printf("zwei Loesungen x1: %lf x2: %lf", x1, x2);
}
```

Aufgabe 3 – Mathematische Funktionen

```c
#include<math.h>
#include<stdio.h>

double f1(double x, double y) {
  if (x == y)
    printf("Teilen durch 0 ist nicht erlaubt!\n");
  return (x + y) / (x - y);
}

double f2(double x, double y) {
  return sqrt((x * x) + (y * y));
}

int main() {
  double x = 22, y = 42;
  printf("f1(%lf, %lf) = %lf\n", x, y, f1(x,y));
  printf("f2(%lf, %lf) = %lf\n", x, y, f2(x,y));
  return 0;
}
```