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```
#include <cstdlib>
#include <iostream>
#include <iomanip>
#include <cmath>

using namespace std;

float precisao(int base, int mantissa)
{
	return (1 + (mantissa - 1) * log10(base));
}

float erroPercentual(long double teste, long double real)
{
	return fabs((teste - real) / real) * 100;
}

int main(int argc, char *argv[])
{
	// Dígitos Sígnificativos
	// ----------------------
	cout << "Digitos Significativos" << endl;
	cout << "======================" << endl;
	cout << "Float: " << floor(precisao(2, 23)) << " - " <<
ceil(precisao(2, 23)) << endl;
	cout << "Double: " << floor(precisao(2, 52)) << " - " <<
ceil(precisao(2, 52)) << endl;
	cout << "Long Double: " << floor(precisao(2, 63)) << " - " <<
ceil(precisao(2, 63)) << endl;

	cout << endl;

	// Erro percentual
	// ---------------
	cout << "Erros Percentuais" << endl;
	cout << "=================" << endl;

	// Float
	// -----
	cout << "- Float:" << endl;
	cout.width(40);
	cout << "1.23456789123456789123456789123: ";
	cout << erroPercentual(float(1.23456789123456789123456789123),
1.23456789123456789123456789123) << "%" << endl;
	cout.width(40);
	cout << "1.9x10^30: ";
	cout << erroPercentual(float(1.9e30), 1.9e30) << "%" << endl;
	cout.width(40);
	cout << "1.9x10^-30: ";
	cout << erroPercentual(float(1.9e-30), 1.9e-30) << "%" << endl;
	cout.width(40);
	cout << "-1.9x10^30: ";
	cout << erroPercentual(float(-1.9e30), -1.9e30) << "%" << endl;
	cout.width(40);
```

```
        cout << "-1.9x10^-30: ";
        cout << erroPercentual(float(-1.9e-30), -1.9e-30) << "%" << endl;
        // Double
        // ------
        cout << "- Double:" << endl;
        cout.width(40);
        cout << "1.23456789123456789123456789123: ";
        cout << erroPercentual(double(1.23456789123456789123456789123),
1.23456789123456789123456789123) << "%" << endl;
        cout.width(40);
        cout << "1.9x10^30: ";
        cout << erroPercentual(double(1.9e30), 1.9e30) << "%" << endl;
        cout.width(40);
        cout << "1.9x10^-30: ";
        cout << erroPercentual(double(1.9e-30), 1.9e-30) << "%" << endl;
        cout.width(40);
        cout << "-1.9x10^30: ";
        cout << erroPercentual(double(-1.9e30), -1.9e30) << "%" << endl;
        cout.width(40);
        cout << "-1.9x10^-30: ";
        cout << erroPercentual(double(-1.9e-30), -1.9e-30) << "%" << endl;

        // Long Double
        // -----------
        long double D80;
        cout << "- Long Double:" << endl;
        cout.width(40);
        cout << "1.23456789123456789123456789123: ";
        D80 = 1.23456789123456789123456789123;
        cout << erroPercentual(D80, 1.23456789123456789123456789123) <<
"%" << endl;
        cout.width(40);
        cout << "1.9x10^30: ";
        D80 = 1.9e30;
        cout << erroPercentual(D80, 1.9e30) << "%" << endl;
        cout.width(40);
        cout << "1.9x10^-30: ";
        D80 = 1.9e-30;
        cout << erroPercentual(D80, 1.9e-30) << "%" << endl;
        cout.width(40);
        cout << "-1.9x10^30: ";
        D80 = -1.9e30;
        cout << erroPercentual(D80, -1.9e30) << "%" << endl;
        cout.width(40);
        cout << "-1.9x10^-30: ";
        D80 = -1.9e-30;
        cout << erroPercentual(D80, -1.9e-30) << "%" << endl;

        system("PAUSE");
        return EXIT_SUCCESS;
}
```

Saída do programa:

```
Digitos Significativos
======================
Float: 7 - 8
Double: 16 - 17
Long Double: 19 - 20

Erros Percentuais
=================
- Float:
       1.23456789123456789123456789123: 4.14999e-006%
                             1.9x10^30: 2.47198e-006%
                            1.9x10^-30: 2.29689e-006%
                            -1.9x10^30: 2.47198e-006%
                           -1.9x10^-30: 2.29689e-006%
- Double:
       1.23456789123456789123456789123: 0%
                             1.9x10^30: 0%
                            1.9x10^-30: 0%
                            -1.9x10^30: 0%
                           -1.9x10^-30: 0%
- Long Double:
       1.23456789123456789123456789123: 0%
                             1.9x10^30: 0%
                            1.9x10^-30: 0%
                            -1.9x10^30: 0%
                           -1.9x10^-30: 0%
Pressione qualquer tecla para continuar. . .
```