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**Date:** 20.8.01  
**Homework number:** 1  
**Homework Title:** Exercise 1.2

**Problem description:**

What are the absolute and relative errors in approximating  $\pi$  by each of the following quantities?

- (a) 3
- (b) 3.14
- (c) 22/7

**Problem solution:**

Find true value of  $\pi$  and select the number of digits in your floating point arithmetic.

By definition:

absolute error = approximate value - true value

relative error = absolute error / true value

**Results:**

True value for  $\pi$  for 5 digits = 3.1416

(a) absolute error:  $3 - 3.1416 = -0.1416$ , relative error:  $0.1416 / 3.1416 = 4.57 \%$

(b) absolute error:  $3.14 - 3.1416 = -0.0016$ , relative error:  $0.0016 / 3.1416 = 0.051 \%$

(c) absolute error:  $3.1429 - 3.1416 = 0.0013$ , rel. error:  $0.0013 / 3.1416 = 0.041 \%$

**Discussion and Comments:**

The best of the above approximations is 22/7.

**Note:** The homework should be send by e-mail to `roman.trobec@ijs.si`

After accepting, it will be published on the Class-web page:

`http://www-e6.ijs.si/~roman/usalz/hpsc03/homeworks`

with the file name equal to the last name and homework number (i.e.

`trobec_hw01.doc`)