

NUMERICAL METHODS (MCSC-202) USING PYTHON

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Exercise-1



1. Open a Python shell, enter the following expressions, and observe the results:

(a) 6

(b) 6*2

(c) 6**2

(d) 6**2**2

(e) 6/12

(f) 6//12

(g) 6/0

(h) 24%5

(i) 3.14*3**2

(j) 3//2*5.0

(k) 3/2*5

(l) 2*2e+2

(m) 2*2e-2

(n) (2e + 14/15)

(o) (2e + 14)/15

(p) exp(1)

(q) >>> 3 + 4*\n... 2**5

2. Let $x = 8$ and $y = 2$. Write the values of the following expressions:

(a) $x + y * 3$

(b) $(x + y) * 3$

(c) $x * * y$

(d) $x \% y$

(e) $x/12.0$

(f) $x//6$

3. Let $x = 2.354$. Write the values of the following expressions.

(a) `round(x)`

(d) `floor(x)`

(g) `abs(x)`

(b) `int(x)`

(e) `ceil(x)`

(h) `type(x)`

(c) `sign(x)`

(f) `sqrt(x)`

(i) `e**x`

4. For $x = 3 + 2j$, Enter the following expression and observe the results:

(a) `real(x)`

(b) `imag(x)`

(c) `abs(x)`

Python considers j as an imaginary unit.

5. Enter the following expressions, and observe the results:

(a) `sin(pi/2)`

(c) `sin(radians(90))`

(b) `sin(90)`

(d) `sin(degrees(pi/2))`

6. The distance traveled by a ball falling in the air is given by the equation $x = x_0 + v_0t + 0.5at^2$. Use Python to calculate the position of the ball at time $t = 5$ second if $x_0 = 10$ m, $v_0 = 15$ m/s, and $a = -9.81$ m/s².
7. **Exponential and Logarithm** The mathematical quantities e^x , $\ln x$ and $\log x$ are calculated with $\exp(x)$, $\log(x)$ and $\log 10(x)$ respectively. Calculate the following quantities.
- e^2 , $e^{\pi\sqrt{163}}$, $\ln(e^2)$, $\log 10(e^2)$ and $\log 10(10^5)$
 - The solution of the equation $3^x = 17$ is $x = \frac{\ln 17}{\ln 3}$. Calculate this x using Python.