

Name of Course	: CBCS B.A. (Prog.)
Unique Paper Code	: 62353327_LOCF
Name of Paper	: SEC-Computer Algebra System
Semester	: III
Duration	: 2 hours
Maximum Marks	: 38 Marks

Attempt any four questions. All questions carry equal marks.

Q1. Form the following grid using appropriate functions

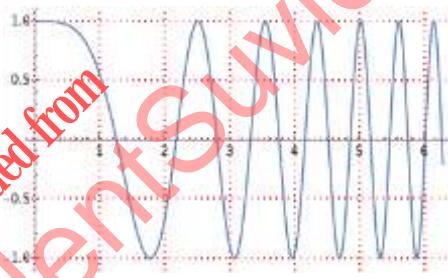
1	1	1	1
2	4	8	16
3	9	27	81
4	16	64	256
5	25	125	625

Each column is right aligned.

Graph each of the functions

- $g(x, y) = 19\cos(x) + \sin(\sqrt{7}x)$, $-20 \leq x \leq 20$
- $2x + 1$, $1 - x^2$, $1 - x - x^2/3$, $-2 \leq x \leq 2$

Q2.



Create the above plot of $f(x) = -\cos(x^2)$, $0 \leq x \leq 2\pi$, with thick, red and dotted grid lines. Change the code so that the grid lines appear only at $x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$ and $y = -1, -3, -5, -7, -9$

Compute each expression.

- $3^8 \bmod 7$
- $5^{10} \bmod 11$

Q3. Write the command to define a polynomial

$$f(x) = x(x^2 + y^2) - a(x^2 - y^2)$$

Plot it in $-a \leq x \leq a$. Write a syntax to solve

$$g(x) = 3x^3 - 16x^2 + 23x - 6$$

and find the numerical solution of $g(x) = 0$.

Q4. Give the syntax to find the derivative of $f(x) = \frac{1}{(1+4x^2)\sqrt{1+3x^2}}$ with respect to x, then evaluate

$$\int_0^{\infty} \frac{1}{(1+4x^2)\sqrt{1+3x^2}} dx$$

and write a command to compute:

$$\sum_{p=0}^{100} (p+2)^5$$

Q5. Find the minimum value of the function $f(x) = x^{2/3}$ and write syntax for it also. Find the extreme point of the function $g(t) = 9t^2 + 2t + 4$ and also plot the given function.

Q6. Generate a 9×9 matrix whose i, j th entry is $i^2 + 2ij$ by using Table command. Also write syntax to get the fifth column of the matrix. Find the trace of the matrix.

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