



UNIVERSITY OF THE PUNJAB

Seventh Semester – 2019

Examination: B.S. 4 Years Program

Roll No. in Fig.

Roll No. in Words.

PAPER: Theory of Approximation & Splines -I
Course Code: MATH-413 Part-I (Compulsory)

MAX. TIME: 30 Min.
MAX. MARKS: 10

Signature of Supdt.:

Attempt this Paper on this Question Sheet only.

Please encircle the correct option. Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the right answer, cutting and overwriting is not allowed. (1x10=10)

1. The composition of two reflections is a
a) Reflection b) Rotation c) Translation
d) Shear
2. is the method of finding value outside the given data points
a) Interpolation b) Approximation c) Extrapolation
d) curve fitting
3. Every isometry is -----
a) One-one b) Onto c) Into d) none of these
4. The Lagrange polynomial for the points (0,0) and (1,1) is
a) $2x$ b) x c) $x/2$ d) All of these
5. The operator used in the Gauss's Backward interpolation formula is
a) E b) δ c) ∇ d) All of these
6. The matrix of rotation is
a) $\begin{bmatrix} \cos 2t & \sin 2t \\ \sin 2t & \cos 2t \end{bmatrix}$ b) $\begin{bmatrix} \cos 2t & \sin 2t \\ \sin 2t & -\cos 2t \end{bmatrix}$ c) $\begin{bmatrix} -\cos 2t & \sin 2t \\ \sin 2t & \cos 2t \end{bmatrix}$
d) $\begin{bmatrix} \cos t & -\sin t \\ \sin t & \cos t \end{bmatrix}$
- 7 $\nabla y_3 =$ -----
a) $y_2 - y_3$ b) $y_2 + y_3$ c) $y_3 - y_2$ d) None of these
- 8 $\mu =$ -----
a) $E+1$ b) $\Delta + \nabla$ c) $\frac{E^{1/2} + E^{-1/2}}{2}$ d) $\frac{E^{1/2} - E^{-1/2}}{2}$
d) None of these
9. The composition of reflection and rotation is
a) Rotation b) Reflection c) Translation d) None of these
10. If y_x is a polynomial of n th degree, then its n th differences are.....
a) one b) zero c) constant d) n



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Course Code: MATH-413 Part – II

MAX. TIME: 2 Hrs. 30 Min.

MAX. MARKS: 50

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q2. Solve the following short questions

(4x5=20)

1. An affine transformation preserves ratios of lengths along parallel straight lines.
2. Drive the normal equations for finding the least-squares polynomial
 $y = A + BX + CX^2$.
3. Find the cubic polynomial which takes the following set of values (0, 1), (1, 2), (2, 1), (3, 10).
4. Show that translation is distance preserving transformation.

Q3. Solve the following Long Questions.

1. The area A of a circle of diameter d is given for the following values

d	80	85	90	95	100	105
A	2491	2505	2518	2531	2544	2556

Calculate the area of a circle of diameter 102.

(08)

2. Find an affine transformation which maps the points (0,0), (1,0), (0,1) onto the points (5,0), (0,5) and (0,6), respectively. (07)
3. Find the power fits $y = Ax^2$ and $y = Bx^3$ for the following data and use $E_2(f)$ to determine which curve fits best. (08)

x_k	2.0	2.3	2.6	2.9	3.2
y_k	5.1	7.5	10.6	14.4	19.0

4. Find the equation after stretching the circle $x^2 + y^2 = 1$, parallel to x -axis by factor 2 and parallel to y -axis by factor 3. (07)