**Group A:**

1. Evaluate the integral ;
2. Evaluate the integral by the substitution rule ;
3. Evaluate the integral by the integration by parts formula ;
4. Evaluate the improper integral ;
5. Find the area of the region between the curves  and ;
6. Find the length of the arc: , ;
7. Find the volume of the solid generated by rotating about the - axis of the region between the parabola and the lines ;
8. Find the area of the surface generated by rotating about the - axis of the curve.

**Group C:**

1. Evaluate ;
2. Find the particular solution of the differential equation  satisfying the following initial conditions ;
3. Find a particular solution of the differential equation  by the method of undetermined coefficients;
4. Applying the method of variation of parameters find a particular solution of the differential equation  satisfying the following initial conditions ;
5. Investigate the convergence of the series , (Convergent: 1, Divergent: 0);
6. Is the series  absolutely convergent? (Yes: 1, No: 0);
7. Find the radius of convergence of the series ;
8. Find the coefficient  of the Fourier series of the 2π-periodic function: .

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Group A** | | | | | | | |  | **Group C** | | | | | | | | | |
| N | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |  | 9 | 10 | 11 | 12 | 13 | | 14 | 15 | | 16 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
|  | 1 | 1 |  | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 1 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
|  | 1 | 1 |  | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 1 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 |  | 0 | 0 | 0 | 0 | 0 |  | 1 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 1 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 1 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 1 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 1 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 1 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 1 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
|  | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |