Department of **Mathematics and Natural Science**

MAT120- Integral Calculus & Differential Equations

Total marks: 10

Assignment-01

Name:

Sec:

ID:

1. **(4 Points)** For problems (i) and (ii) estimate the area of the region between the function and the x-axis on the given interval using n = 6 and using,
   (a) the right end points of the subintervals for the height of the rectangles,
   (b) the left end points of the subintervals for the height of the rectangles and,
   (c) the midpoints of the subintervals for the height of the rectangles

   (i) $g(x) = 4 - \sqrt{x^2 + 2}$ on $[-1,3]$
   (ii) $f(x) = x^3 - 2x^2 + 4$ on $[1,4]$

2. **(2 Points)** Evaluate the following integrals (use method of substitution rules):

   $(i) \int \frac{1}{\sqrt{x}} cos\sqrt{x}\, dx$ $(ii) \int \frac{2x+1}{x^2+x-2} dx$ $(iii) \int \frac{e^x(x+1)}{\cos^2(xe^x)}\, dx$ $(iv) \int \tan^3 x\sqrt{secx}\ dx$

3. **(2 Points)** Evaluate the following integrals (use method of integration by parts):

   $(i) \int \ln (x + \sqrt{x^2 + a^2}) dx$
   $(ii) \int (\sin^{-1} x)^2\, dx$

4. **(2 Points)** Find the Reduction formula of the following integrals:

   $(i) \int \cos^8 x\, dx$
   $(ii) \int \tan^7 x\, dx$