W03 - Homework

Stepwise problems - Thu. 11:59pm

Partial fractions

01

Distinct linear factors

Compute the integral:

$$\int \frac{1}{(x+2)(x-3)}\,dx$$

02

Long division first

Compute the integral:

$$\int \frac{2x^3+3x^2+7x+4}{x+1}\,dx$$

03

Repeated factor

Compute the integral:

$$\int \frac{1}{x(x-1)^2}\,dx$$

Numerical integration

04

Simpson's Rule

Elapsed Time (min)	0	15	30	45	60	75	90	105	120	135	150	165	180
Temp (°C)	21	21.3	21.5	21.8	21.6	21.2	20.8	20.6	20.9	21.2	21.1	21.3	21.2

The chart above shows a record of ambient temperatures measured each 15 minutes over 3 hours. Compute the approximate average temperature using Simpson's Rule. You may use a calculator to resolve the arithmetic in your final expression.

Regular problems - Sat. 11:59pm

Partial fractions

05

Partial fractions - irreducible quadratic

Compute the integral:

$$\int \frac{x^2}{x^2+9}\,dx$$

06

Partial fractions - long division

Compute the integral:

$$\int \frac{x^2-x+1}{x^2+x}\,dx$$

07

Partial fractions - big generic

Give the *generic* partial fraction decomposition (no need to solve for the constants):

$$\frac{x+2}{(x^2+2)(x-1)^3(x^2-9)}$$

08

Partial fractions - linear and quadratic

Compute the integral:

$$\int \frac{5x^2-5x+14}{(x-2)(x^2+4)}\,dx$$

09

Partial fractions - repeated factor

Compute the integral:

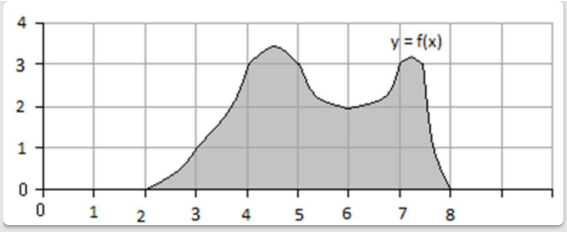
$$\int \frac{1}{x(x-1)^3}\,dx$$

Numerical integration

10

Simpson's Rule for volume by shells

Use Simpson's Rule with $n=6$ to compute the volume of the solid obtained by revolving the pictured region about the y-axis. Can you do it without using a calculator?



11

Area of a garden bed

The width of a garden bed is measured every 2 feet as shown. How much mulch (in cubic yards) should I buy to cover this garden bed with a 6-inch layer of mulch?