W03 Regular

01

✎ Partial fractions - irreducible quadratic

Compute the integral:

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

✎ Partial fractions - long division

Compute the integral:

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

✎ **Partial fractions - big generic**

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

$$\frac{x+2}{(x^2+2)(x-1)^3(x^2-9)} \quad = \quad \frac{A}{?} + ?$$

✐ Partial fractions - linear and quadratic

Compute the integral:

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

✎ Partial fractions - repeated factor

Compute the integral:

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

✏ Partial fractions - rationalize first

For each of these integrals, make a u-substitution that changes the integrand into a rational function. Write the integral in terms of u for your answer. You do not have to compute the u-integral.

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

(b) $\int \frac{\sqrt{x}}{x - 1} \, dx$

✐ **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?
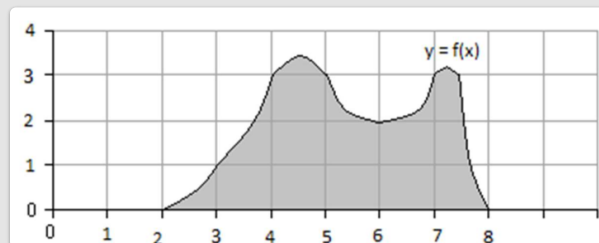
✎ Area of a garden bed

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?

4.5 3.3 3.3 5 6 5 4 5 4