

**Problem statement** The region  $R$  is bounded below by the  $x$ -axis, bounded on the left by the line  $x = 1$ , bounded on the right by the line  $x = 2$ , and bounded above by the curve  $y = \frac{5 + x}{x^2 + 4x + 3}$ .

a) Sketch the region  $R$  and set up a definite integral that gives the area of  $R$ . Then calculate the integral in two ways:

- i) Approximately using the `fnInt(` program in your calculator.
- ii) Exactly using the method of partial fractions.
- iii) Check that the two answers are “the same” (that is, find approximate values for the result of the second method).

b) The region  $R$  is rotated around the  $x$ -axis to generate a solid body  $B$ . Sketch  $B$  and set up a definite integral that gives the volume of  $B$ . Calculate the integral in two ways:

- i) Approximately using the `fnInt(` program in your calculator.
- ii) Exactly using the method of partial fractions (be careful how you set this up – there are *four* undetermined coefficients in the partial fraction decomposition).
- iii) Check that the two answers are “the same” (that is, find approximate values for the result of the second method).