## **Question 4** (10 marks)

Consider the function  $f(x) = \frac{x^3 - 2x + 5}{x^2 + 1}$ .



(b) On the axes in Figure 3, draw the function  $f(x) = x - \frac{3x-5}{x^2+1}$ . Clearly show the behaviour of the function near any asymptotes.



Figure 3

(3 marks)



The graph of y = g(f(x)) is shown in Figure 4.



Figure 4

- (d) Consider the solid obtained by rotating the graph of y = g(f(x)) about the *x*-axis between x = -1 and x = 1.
  - (i) Show that the volume of this solid is given by the equation







(3 marks)