

**Problem statement** Suppose  $f(x) = 2x^2 - x^3$  and  $g(x) = \sin\left(\frac{\pi x}{2}\right)$ .

a) Use your calculator to sketch the two functions  $y = f(x)$  and  $y = g(x)$  on the interval  $[0, 2]$ . Note all the points of intersection as precisely as you can.

b) What is the exact value of  $\int_0^2 f(x) - g(x) dx$ ? Find a numerical approximation of this value. What does the value of this integral tell you about the areas of the regions between the two graphs?