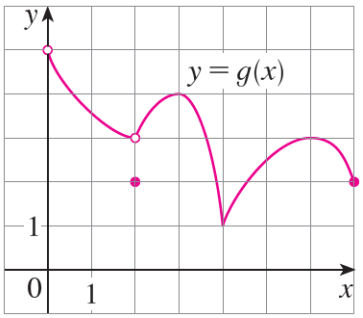
Exercise 1 Use the graph to state the absolute and local maximum and minimum values of the function.



Exercise 2 Sketch the graph of a function f that has given properties.

(a) Continuous on $[1, 5]$; absolute maximum at 4; absolute minimum at 5; local maximum at 2; local minimum at 3.

(b) Continuous on $[1, 5]$; absolute maximum at 2; absolute minimum at 5; 4 is a critical number but there is no local maximum or minimum there.

(c) Defined on $[-1, 2]$; has an absolute maximum but no local maximum.

(d) Defined on $[-1, 2]$; has a local maximum but no absolute maximum.

Exercise 3 Find the absolute maximum and minimum values of f on the given interval.

(a) $f(x) = x^3 - 6x^2 + 5$, $[-3, 5]$

(b) $g(x) = x + \cot(x/2)$, $[\pi/4, 7\pi/4]$

(c) $h(x) = e^x + e^{-2x}$, $[0, 1]$

Exercise 4 An object with weight W is dragged along a horizontal plane by a force acting along a rope attached to the object. If the rope makes an angle θ with the plane, then the magnitude of the force is

$$F = \frac{\mu W}{\mu \sin(\theta) + \cos(\theta)}$$

where μ is a positive constant called the *coefficient of friction* and where $0 \leq \theta \leq \pi/2$. Show that F is minimized when $\tan(\theta) = \mu$.