

Show all relevant work!

YOU MAY USE A CALCULATOR TO VERIFY SOLUTIONS, BUT NOT TO PROVIDE THEM.

1. Using figures 1 and 2, estimate

(a)  $\lim_{x \rightarrow 1^-} (f(x) + g(x))$ : \_\_\_\_\_

(b)  $\lim_{x \rightarrow 1^+} (f(x) + 2g(x))$ : \_\_\_\_\_

(c)  $\lim_{x \rightarrow 1^-} f(x)g(x)$ : \_\_\_\_\_

(d)  $\lim_{x \rightarrow 1^+} \frac{f(x)}{g(x)}$ : \_\_\_\_\_

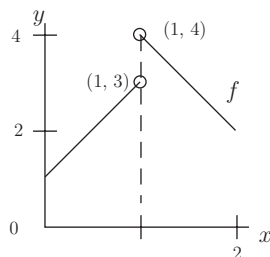


Figure 1

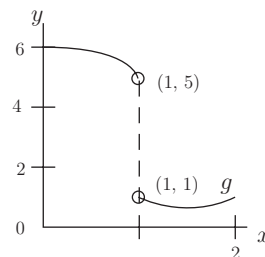
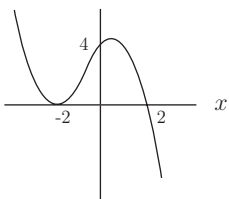


Figure 2

2. Investigate  $\lim_{h \rightarrow 0} (1 - h)^{1/h}$  numerically.3. Find a value of the constant  $k$  such that the limit exists.

$$\lim_{x \rightarrow 1} \frac{x^2 - kx + 4}{x - 1}$$

4. Find a cubic polynomial for the graph below.



5. The height of an object above ground at time  $t$  is given by  $s = v_0t - \frac{g}{2}t^2$ , where  $v_0$  is the initial velocity and  $g$  is acceleration due to gravity.

(a) At what height is the object initially?

(b) How long is the object in the air before it hits the ground?

(c) When will the object reach its maximum height?

(d) What is that maximum height?