

**MODULE 2****FORMULAS AND GRAPHS,  
ROOTS, MAXIMA AND MINIMA**

Name: \_\_\_\_\_ Points: \_\_\_\_\_

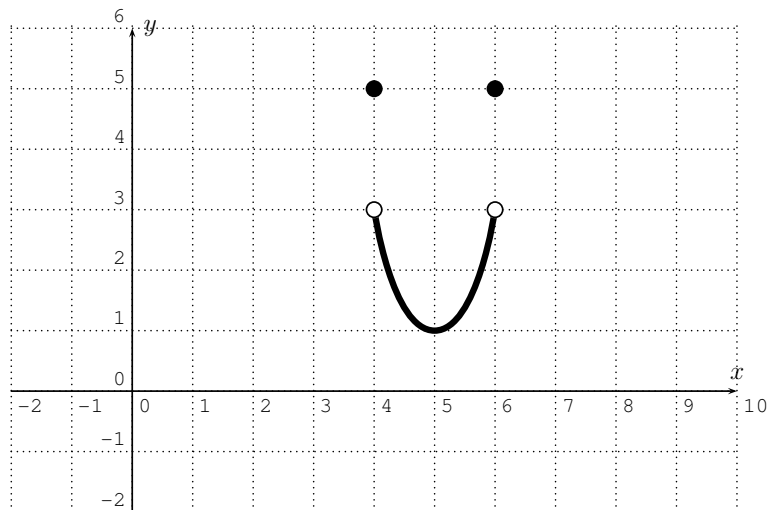
**Exercise 1.**

(a) Find the difference quotient  $\frac{f(x+h)-f(x)}{h}$  for  $f(x) = 3x^2 + 2x - 1$ .

(b) Find the difference quotient  $\frac{f(x+h)-f(x)}{h}$  for  $f(x) = x^3$ .

- (c) Find the difference quotient  $\frac{f(x)-f(a)}{x-a}$  for  $f(x) = x^2$ .

**Exercise 2.** Consider the graph of a function  $y = f(x)$  displayed below.



Find the following data.

- (a) Domain of  $f =$
- (b) Range of  $f =$

(c)  $f(5) =$

(d)  $f(6) =$

(e)  $f(7) =$

(f)  $f(4.5) =$

**Exercise 3.**

(a) Find all roots of  $f(x) = x^3 - 3x - 1$  and approximate them to the nearest hundredth.

(b) Find all maxima and minima of  $f(x) = x^4 - 5x^2 + 4$  and approximate them to the nearest thousandth.

(c) Find all maxima and minima of  $f(x) = x^3 - 12x^2 - 100x + 1200$  and approximate them to the nearest tenth.