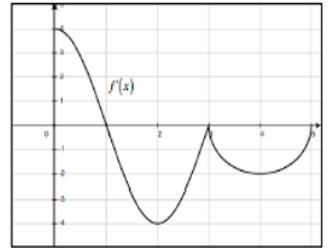


## UNIT 5 Free Response Test Review

1.  $f'(x) = 2\sin x - 1$

- a. On what intervals is  $f(x)$  increasing on  $[0, 2\pi)$ ? Give a reason for your answer.
- b. Determine if  $f(x)$  has any relative extrema on  $[0, 2\pi)$ . Give a reason for your answer.
- c. On what interval(s) is  $f(x)$  concave up on  $[0, 2\pi)$ ? Give a reason for your answer.
- d. At what x-value(s) does  $f(x)$  have a point on inflection on  $[0, 2\pi)$ ? Justify your answer.

2. The figure shows the graph of  $f'(x)$ , the derivative of the function  $f$ , for  $0 \leq x \leq 5$ .

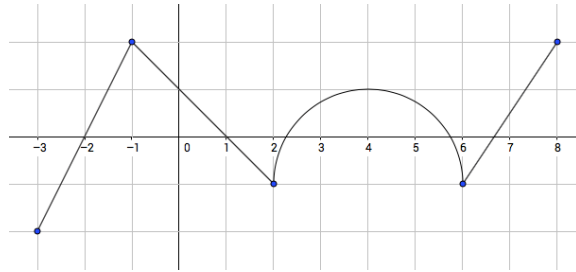


- a. Find all the values of  $x$ , for  $0 < x < 5$ , at which  $f$  attains a relative maximum. Justify your answer.

- b. Find all the values of  $x$ , for  $0 < x < 5$ , at which  $f$  attains a relative minimum. Justify your answer.

- c. Find all the values of  $x$ , for  $0 < x < 5$ , at which  $f$  has an inflection point. Justify your answer.

3. Use the graph of  $f'(x)$  below to answer the following questions.



- On what interval(s) is  $f(x)$  increasing? Justify your answer.
- On what interval(s) is  $f(x)$  concave up? Justify your answer.
- At what  $x$ -value(s) does  $f(x)$  have a point of inflection? Justify your answer.
- At what  $x$ -value(s) does  $f(x)$  have a relative maximum? Justify your answer.
- On what interval(s) is  $f(x)$  increasing and concave down? Justify your answer.