Past-paper walk-through

Connecting Differentiability and Continuity: Determining When Derivatives Do and Do Not Exist ▪ 2.4

eXercise

Questions in this set

- 2017 Q3

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- // separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = "or words to that effect" – the wording need not match.

Question 3

2017 ▪ Q3

[Graph of f', labeled "Graph of f'"; consists of a semicircle and three line segments. x-axis x, y-axis y. A line segment starts at the labeled point $(-6, 2)$ and decreases linearly to the point $(-2, 0)$ on the x-axis. From $(-2, 0)$ to $(0, 0)$ the graph is a semicircle dipping below the x-axis (minimum around $(-1, -1)$) and returning to the x-axis at $(0, 0)$. From $(0, 0)$ the graph rises linearly to the labeled point $(3, 2)$. From $(3, 2)$ the graph decreases linearly to the point $(5, 0)$ on the x-axis. Gridlines/tick marks are shown at integer x-values and at $y = 1$.]

The function f is differentiable on the closed interval $[-6, 5]$ and satisfies $f(-2) = 7$. The graph of f', the derivative of f, consists of a semicircle and three line segments, as shown in the figure above.

(a) Find the values of $f(-6)$ and $f(5)$.

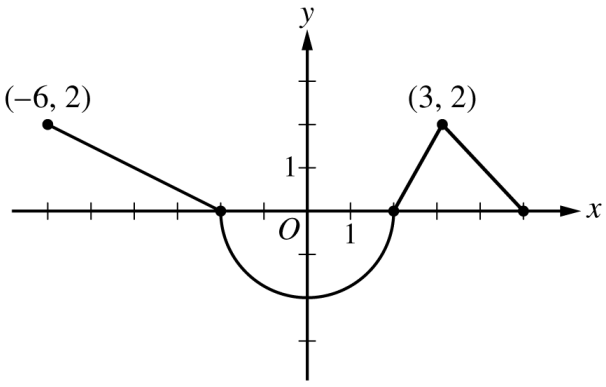
(b) On what intervals is f increasing? Justify your answer.

Question 3

(c) Find the absolute minimum value of f on the closed interval $[-6, 5]$. Justify your answer.

(d) For each of $f'(-5)$ and $f'(3)$, find the value or explain why it does not exist.

Question 3



Graph of f'