

Quiz 7 Key — MA16010 — October 18, 2017

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Min	Mean	Max
1	3.3	5

Let $f(x) = 3x^3 - 4x + 1$. Please answer the following problems in complete sentences.

1. Find $f'(x)$ and $f''(x)$.

$$f'(x) = 9x^2 - 4 \text{ and } f''(x) = 18x.$$

2. Find any intervals where $f(x)$ is concave up and any intervals where $f(x)$ is concave down.

$$f(x) \text{ is concave up on } (0, \infty) \text{ and concave down on } (-\infty, 0).$$

3. Give the coordinates of the inflection point.

$$f(x) \text{ has an inflection point at } (0, 1).$$

4. Find any intervals where $f(x)$ is increasing and any intervals where $f(x)$ is decreasing.

$$f(x) \text{ is increasing on } (-\infty, -\frac{2}{3}) \text{ and on } (\frac{2}{3}, \infty). \text{ } f(x) \text{ is decreasing on } (-\frac{2}{3}, \frac{2}{3}).$$

5. On what interval is $f(x)$ concave up and decreasing?

$$f(x) \text{ is concave up and decreasing on } (0, \frac{2}{3}).$$