

4期生数学サブゼミテスト⑥

About 30 minutes

NOTICE

- 1 All the numbers in this test are real number, if there is no notice.
- 2 Hurry up as fast as possible.
- 3 If you have any questions, raise your hand quietly and let officer know.
- 4 You can use pencil and ruler.
- 5 You must answer on “answer sheet” differentiated from “question sheet”. If you answer on “question sheet”, you will get no score with the answers.
- 6 Write your name at the top space on the answer sheet.
- 7 You can also get some scores from the process of answering.
In other word, you must write the process.

1. $f(x) = x^2$. Show $\frac{d}{dx} f(x) = 2x$ with $\frac{d}{dx} f(x) \equiv \lim_{dx \rightarrow 0} \frac{f(x+dx) - f(x)}{dx}$.

2. Differentiate these functions with respect to x .

(You do not use derivation definition: $\frac{d}{dx} f(x) \equiv \lim_{dx \rightarrow 0} \frac{f(x+dx) - f(x)}{dx}$.)

(1) $f(x) = x^3$ (2) $f(x) = \frac{1}{x}$ (3) $f(x) = 1$ (4) $f(x) = \sqrt{x}$

(5) $f(x) = 2x^3 - x^2 + 4x - 2$ (6) $f(x) = \sqrt{x} - \frac{1}{3x} + 1$

3. Obtain the tangential lines of these points on the functions.

(1) $(x,y)=(1,2)$ on $y = 2x^3$. (2) $(x,y)=(4,2)$ on $y = \sqrt{x}$.

4. Draw these functions on xy planes.

(1) $f(x) = -x^3 + 12x$

(2) $f(x) = \frac{1}{3}x^3 + x^2 + x - 1$

Good Luck!