

## 4期生数学サブゼミテスト⑨

About 20 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.

Answer in Japanese.

1. Define “exponential”.
2. Show the graphs of
  - a)  $y = a^x (a > 1)$
  - b)  $y = a^x (0 < a < 1)$
  - c)  $y = 4^x$
3. Define “logarithms” with  $y = \log_a x$ .
4. Show the graphs of
  - a)  $y = \log_a x (a > 1)$
  - b)  $y = \log_a x (0 < a < 1)$
  - c)  $y = \log_5 x$
5. What is the “inverse function” of  $y = a^x$ ? Show it by using algebra and graph.
6. Explain the relationship between  $y = \log_a x$  and  $y = \log_{\frac{1}{a}} x$  graphically.
7. You can see a Cobb-Douglas function:  $U = x^{\frac{2}{5}} y^{\frac{3}{5}}$ . Explain the distinction of the logarithmic function for  $U$ .