
STUDENT NAME

STUDENT ID

MARKS /25

YOU ARE GIVEN 30 MINUTES TO FINISH ALL QUESTIONS; PLEASE SHOW ALL YOUR WORK TO GET FULL CREDITS.

1. Answer the following questions.

[1] (a) Evaluate $f(-1)$, if the function $f(x) = \begin{cases} \sqrt{x-1}, & \text{if } x > 3 \\ x^2 - 1, & \text{if } x \leq 3. \end{cases}$

[2] (b) Find the domain of the function $f(x) = \sqrt{8-2x}$.

[2] (c) Find the range of the function $f(x) = x^2 - 4x + 2$.

[3] 2. Find the exactly value of the expression $2^{\log_2 3 + \log_2 5}$.

3. Solve the following equations.

[3] (a) $2^{x^2-2x} = \left(\frac{1}{4}\right)^{x-3}$.

[2] (b) $\ln(\ln x) = 0$.

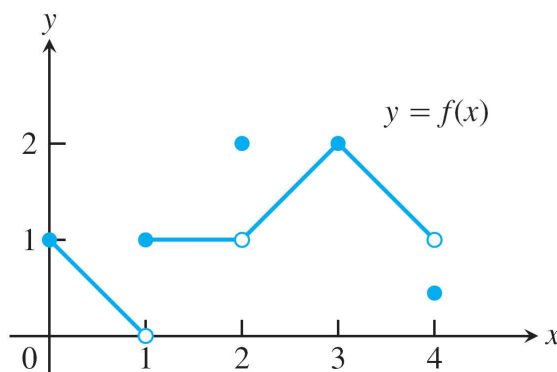
4. It has been observed that the MATH 1520 midterm marks P is a function of the number of hours t students spend studying every week. Using *JUMP SE 5.0* (a statistical software), we decided that this functions is given by

$$P = P(t) = 100 - 80e^{-t/3}$$

where P and t are measured in percentage (out of 100) and hours, respectively.

- [1] (a) What do you expect if you don't study at all?
- [3] (b) How many hours a week should you study if you want 60% on your midterm? (*You may leave your answer in logarithmic form.*)

- [8] 5. Consider the graph on the right



Find each of the following where possible, writing “NONE” if it doesn't exist.

- | | |
|---|---|
| (a) $\lim_{x \rightarrow 1^-} f(x) =$ _____ | (e) $\lim_{x \rightarrow 2^-} f(x) =$ _____ |
| (b) $\lim_{x \rightarrow 1^+} f(x) =$ _____ | (f) $\lim_{x \rightarrow 2^+} f(x) =$ _____ |
| (c) $\lim_{x \rightarrow 1} f(x) =$ _____ | (g) $\lim_{x \rightarrow 2} f(x) =$ _____ |
| (d) $f(1) =$ _____ | (h) $f(2) =$ _____ |