Fall 2022 Math 120 A midterm 3

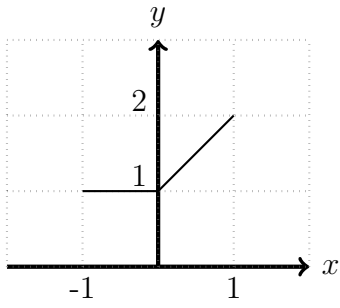NAME (First,Last) : ...................................................

UW email: ...........................................................

Student ID ...........................................................

Section ...............................................................

- Please use the same name that appears in Canvas.

- IMPORTANT: Your exam will be scanned: DO NOT write within 1 cm of the edge. Make sure your writing is clear and dark enough.

- IMPORTANT : do not turn in any scratch paper.

- IMPORTANT: Write your NAME (first, last) on top of the third page of this exam.

- If you run out of space, continue your work on the back of the second page and indicate clearly on the problem page that you have done so.

- Unless stated otherwise, you **MUST** show work for credit.

- Your work needs to be neat and legible.

- Unless the problem gives you different instructions, you can give exact answers or round off your answers to 2 decimal places.

- The only calculator allowed is the TI 30X IIS. You are allowed an 8x11 sheet of notes, written both sides.

- Box your final answer, when appropriate.

- Raise your hand if you have a question.

1. Below is the graph of $y = f(x)$. $f$ has domain $-1 \le x \le 1$ and range $1 \le y \le 2$.



(a) Draw a careful graph of $g(x) = -2f(\frac{x}{3} + 1)$.
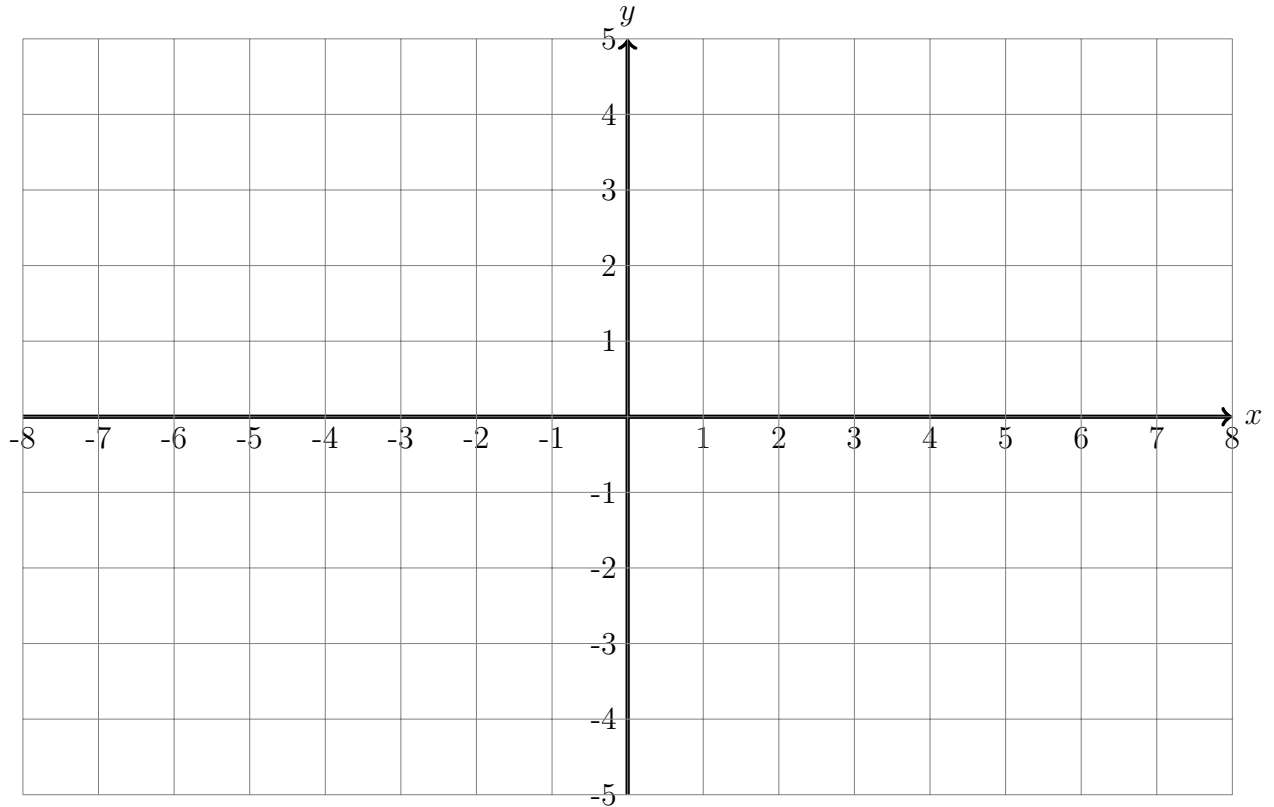


(b) What is the domain of $g(x)$ ?

(c) What is the range of $g(x)$?

2. Snakes are dying on the island of Rodents; as a result, the rat population is increasing exponentially. The snake population decreases 15% every 5 years. In January 2022 there were 1000 snakes. The rat population doubles every 3 years and in 3 years, in January 2025, there will be 5000 rats on the island. When will the rat population be 10 times the snake population? Give your answer in years, for example "in the year 2090".