

# QUIZ 4 - MATH 140

Friday, September 25

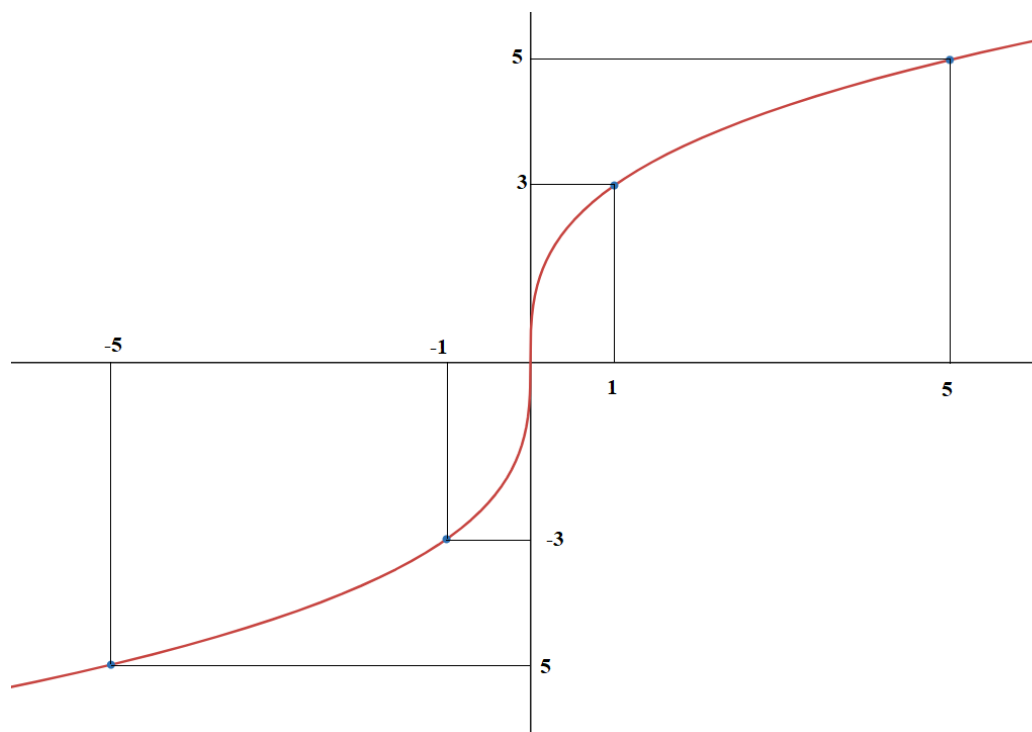
YOUR NAME: \_\_\_\_\_

George Voutsadakis

Read each problem **very carefully** before starting to solve it and do only what is asked. Each problem is worth around 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. [4 points]

- (a) The following is the graph of a function  $y = f(x)$  (with an **unspecified formula**). Please, draw as carefully as you can (on the same system of axes) the graph of  $y = f^{-1}(x)$ .



- (b) Consider the function  $g(x) = \frac{1}{7}x^3 + 5$ . Find a formula for  $g^{-1}(x)$ .

2. [4 points] If  $f(x) = \frac{5x - 1}{3 - 2x}$ , find a formula for  $f^{-1}(x)$ .

3. [4 points]

(a) The population of a small town was 15,000 in 2020 and is projected to increase to 18,000 by 2030. If we assume an exponential trend, construct a function  $P(t)$  for the population at time  $t$  (please, mention explicitly any ad hoc assumptions).

(b) Suppose your dad made an investment at the start of 2026 worth \$20,000. If he projects the investment's worth to be \$30,000 after 10 years, find the (constant) annual return rate that would correspond to the return of the investment, assuming quarterly compounding.