

EXAM 1

MATH 32

NAME:

SID:

GSI: Anqi / Dun / Katie / Yonah / unknown

- (1) Do not open this packet until instructed to do so.
- (2) No calculators or references are permitted.
- (3) You have 50 minutes to complete 5 equally-weighted questions.
- (4) Please write as neatly as possible, from left to right and top to bottom.
- (5) Clearly label any questions for which you use the extra space.

(1) Let the functions f and g be defined by

$$f(x) = \frac{1}{x+1} \quad \text{and} \quad g(x) = \frac{1}{x-1}.$$

(a) Write a formula for the function $f + g$ and simplify it as much as possible.

(b) Find the domain of $f + g$.

(c) Find the zero(s) of $f + g$.

(2) Find the set of real numbers x for which the following inequality is true:

$$\left| \frac{4}{x-3} \right| \leq 2$$

(3) Let the functions f and g be defined by

$$f(x) = x^2 \quad \text{and} \quad g(x) = 3x - 6.$$

(a) Write a formula for the function $g \circ f$.

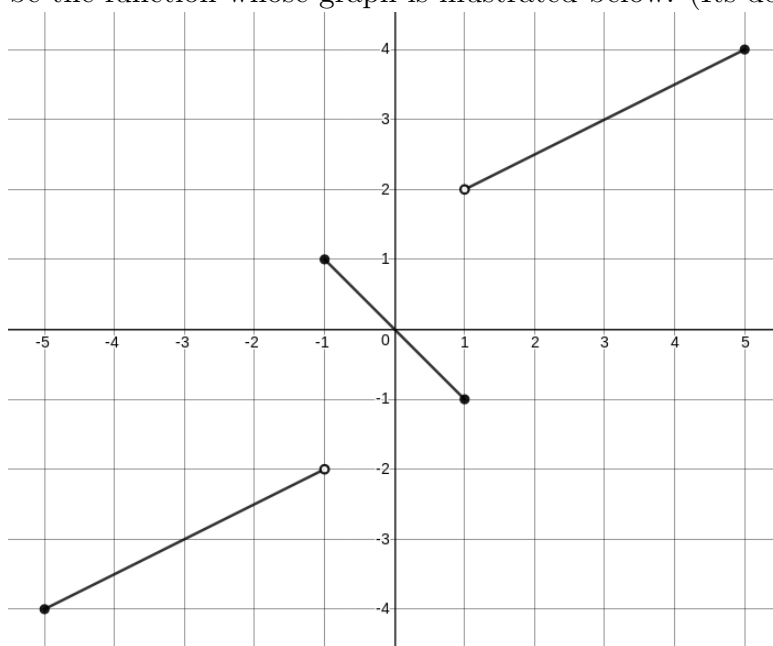
(b) Describe (in order) the transformations required to obtain the graph of $g \circ f$ from the graph of f .

(c) Does $g \circ f$ have an inverse?
Why or why not?

yes / no

- (4) Find the equation for the line that is perpendicular to the line $y = 3x + 5$ and passes through the vertex of the parabola $y = x^2 + 4x - 1$.

(5) Let f be the function whose graph is illustrated below. (Its domain is $[-5, 5]$.)



(a) Give an interval on which f is increasing.

(b) Find the range of f .

(c) Estimate $f^{-1}(-3)$.

(d) Find the domain of f^{-1} .

(e) Is f ... even / odd / both / neither?

EXTRA SPACE