

EXAM 1 - MATH 111

Friday, February 9

YOUR NAME: _____

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Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. (a) Find the domain of $f(x) = \sqrt{100 - 3x}$.

(b) Let $f(x) = 3x^2 + 22x$. Find the values of the input for which $f(x) = -7$.

2. (a) Find the average rate of change of the function $f(x) = 2x^2 - x + 3$ on $[3, 3 + h]$ and simplify.

- (b) Sketch the graph of the piece-wise defined function (please, do a neat job and label all important points)

$$f(x) = \begin{cases} x + 7, & \text{if } x \leq -1 \\ x^2, & \text{if } -1 < x \leq 2 \\ -2x + 6, & \text{if } x > 2 \end{cases} .$$

3. Suppose $f(x) = \frac{1}{3x+2}$ and $g(x) = \frac{1}{5-x}$.

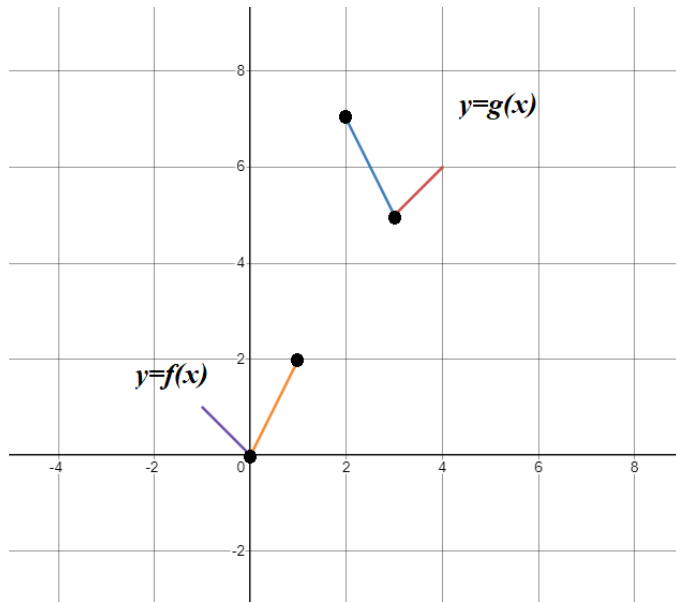
(i) Find the domain of f .

(ii) Find the domain of g .

(iii) Give the conditions that need to be imposed for x to be in the domain of $f \circ g$.

(iv) Work with the conditions in (iii) to find the domain of $f \circ g$.

4. The graphs of $y = f(x)$ and $y = g(x)$, which is a transformed version of $y = f(x)$, are shown in the picture (only filled-in endpoints are included).



- (a) Find the domain and range of $y = g(x)$.

- (b) Fill in the following table giving the formulas and a description of the individual transformations that are required to produce $y = g(x)$ starting from $y = f(x)$.

$y = f(x)$ \longrightarrow ()

\longrightarrow ()

$\longrightarrow y =$ ()

5. (a) Starting with $y = f(x)$, we would like to get to $y = 5f(x+3) - 7$. Fill in the blanks in the following table giving the formulas and a description of the individual transformations that are required.

$$y = f(x) \longrightarrow \quad \quad \quad (\quad \quad \quad)$$

$$\longrightarrow \quad \quad \quad (\quad \quad \quad)$$

$$\longrightarrow y = 5f(x+3) - 7 \quad (\quad \quad \quad)$$

- (b) Solve the absolute value equation

$$11|5 + 3x| + 7 = 51.$$