MATH 113: FALL 2020 QUIZ 2: FUNCTIONS

You are allowed one page of notes and a calculator. No phones. More than 25pts to earn. Thanks!

Problem 1: (4pts) Suppose $f(2) = 12$ and $g(2) = 30$, $f(3) = 6$ and $g(3) = 7$, $f(4) = 21$ and $g(4) = 0.5$. In addition, suppose $g(12) = 42$. Calculate the following:

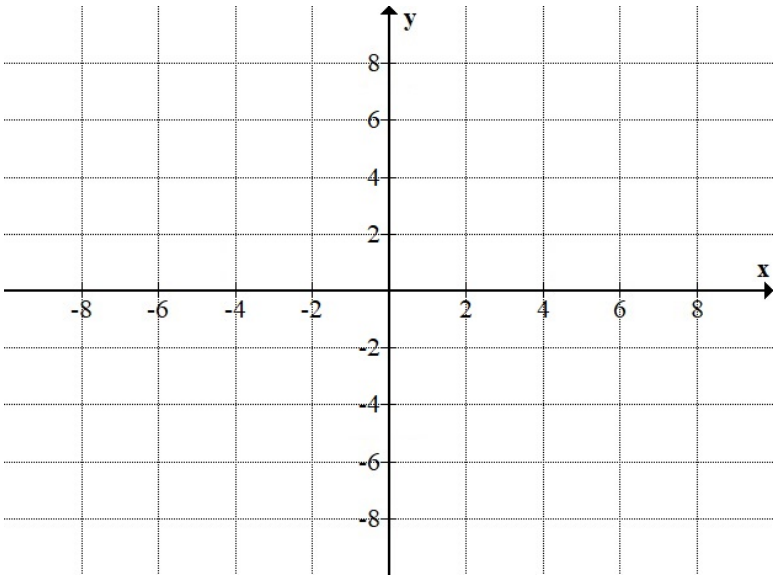
(a.) $(f+g)(2) =$ _____.

(b.) $(fg)(3) =$ _____.

(c.) $\left(\frac{f}{g}\right)(4) =$ _____.

(d.) $(g \circ f)(2) =$ _____.

Problem 2: (2pts) Let $f(x) = x^2 + 4x - 2$. Carefully graph $y = f(x)$ on the grid provided below.



Problem 3: (1pts) Express the range of the function in the previous problem in interval notation.

Problem 4: (3pts) The difference quotient based at a for $f(x)$ is given by $\frac{f(a+h)-f(a)}{h}$ where $h \neq 0$. Calculate and simplify the difference quotient for $f(x) = 2x^2 - 7$.

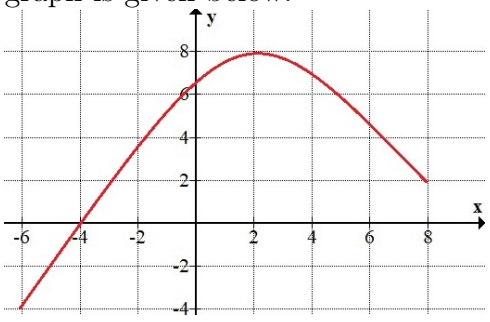
Problem 5: (2pts) Let $f(x) = \begin{cases} x^2 + 3 & : -6 < x < 0 \\ 10 + \sqrt{x} & : 0 \leq x \leq 8 \end{cases}$.

Given the function above, calculate:

(**a**.) $f(-2) =$ _____.

(**b**.) $f(4) =$ _____.

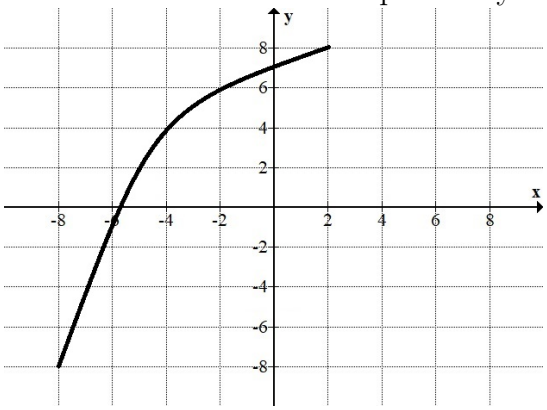
Problem 6: (1pts) Find the average rate of change from $x = -6$ to $x = 8$ for the function whose graph is given below:

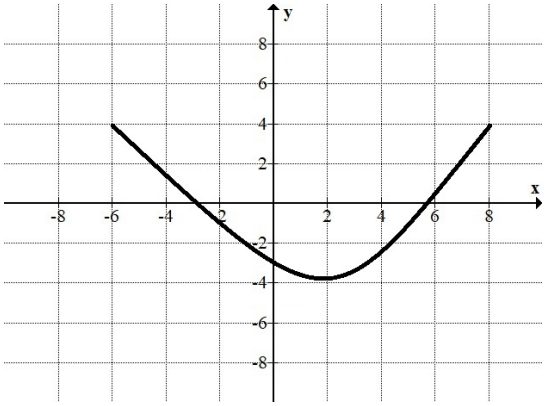


Problem 7: (2pts) Given $f(x) = \sqrt{4-x}$ and $g(x) = \sqrt{4+2x}$, calculate the formula for $(f+g)(x)$ and find the domain of $f+g$.

Problem 8: (2pts) For the functions given above, find the formula and domain for f/g.

Problem 9: (4pts) If possible, graph the inverse function for each function graph below. If the function does not have an inverse explain why.





Problem 10: (3pts) Let $f(x) = x^2 + 2$ and $g(x) = \dfrac{1}{x} + \sqrt{x}$. Find the formulas for:

(a.) $(f \circ g)(x) =$

(b.) $(g \circ f)(x) =$

(c.) $(f \circ f)(x) =$

Problem 11: (2pts) For each formula given below fill in the blank as appropriate:

(a.) $(f \circ g)(x) = \sqrt{x^2 + 3x + 2}$ has $f(x) = \sqrt{x}$ and $g(x) =$ _____.

(b.) $(f \circ g)(x) = (x^2 + 3x - 9)^4$ has $f(x) =$ _____ and $g(x) = x^2 + 3x - 9$.

Problem 12: (4pts) Consider $f(x) = \sqrt{x^3 - 16x}$. Find the domain of the function in interval notation.