

MAT 1400: Quiz 2
April 8, 2019

Name: _____

1. What is the domain of the function defined by each of the following formulas? (Assume the maximal domain of all possible real inputs.) In addition, calculate $f(1)$ for each function. Finally, determine if the function is even, odd, or neither.

(a) $f(x) = \sqrt{x-1}$

Domain(f): _____ $f(1) =$ _____ Even Odd Neither (circle one)

(b) $f(x) = \frac{x-1}{x+1}$

Domain(f): _____ $f(1) =$ _____ Even Odd Neither (circle one)

2. Let $f(x) = \sqrt{x-1}$, and let $g(x) = x^3 + 1$.

(a) Write the formula for $\frac{g}{f}(x)$.

(b) What is the domain of $\frac{g}{f}$.

(c) Write the formula for $f \circ g(x)$.

(d) What is the domain of $f \circ g$.

3. For each function h , provide formulas for functions f and g such that $h = f \circ g$.

(a) $h(x) = 2x + 1$

$g(x) =$

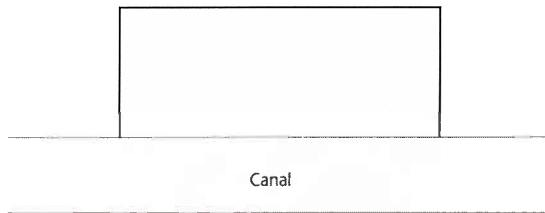
$f(x) =$

(b) $h(x) = (x + 7)^2$

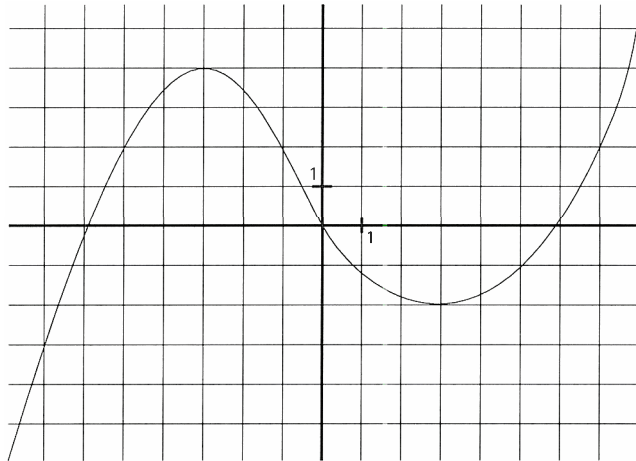
$g(x) =$

$f(x) =$

4. A farmer has 40 meters of fence she wants to use to enclose a field that is next to a straight canal. The canal will form one side of the field; fencing is only required on the other three sides. Find the dimensions of the field of largest area that can be enclosed in this way. *Be sure to show your solution process and reasoning!*

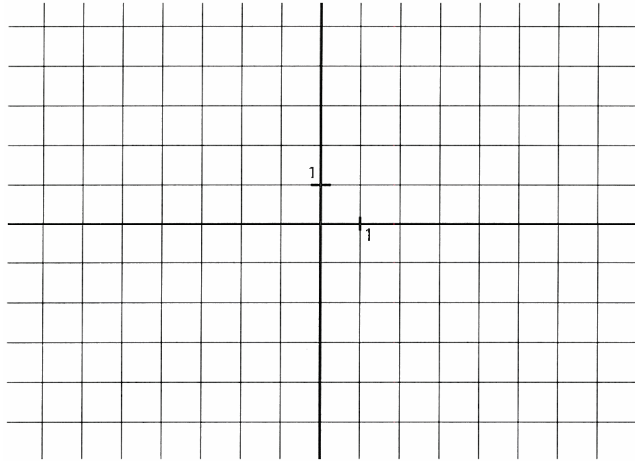


5. Consider the function $f : \mathbb{R} \rightarrow \mathbb{R}$ whose graph $y = f(x)$ is shown below.



- (a) List the intervals on which this function is increasing.
- (b) List the intervals on which this function is decreasing.
- (c) List any points on the graph that are local minima of the function.
- (d) List any points on the graph that are local maxima of the function.
- (e) Calculate the average rate of change in the value of the function between $x = 3$ and $x = 7$

(f) On the grid below, sketch the graph of $y = \frac{1}{2}f(x + 1) + 1$.



The graph of $y = f(x)$ is shown below the grid for your convenience.

