

Math 1 – Worksheet 1

Written by Victoria Kala

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Name: _____

1. Consider the function $f(x) = x^2 - x$.

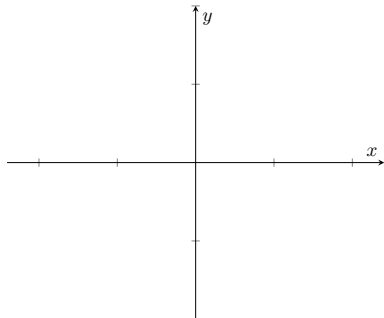
(a) Evaluate $f(0)$, $f(1)$. Is f a one-to-one function?

(b) Find $f(a)$ and $f(a + h)$.

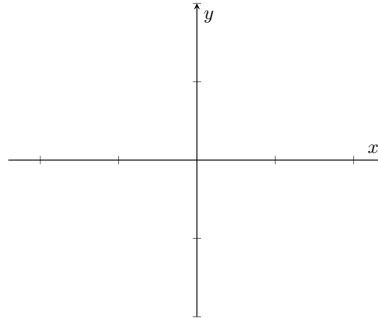
(c) Use your work in (b) to evaluate $\frac{f(a + h) - f(a)}{h}$. Simplify as much as possible. This expression is called the rate of change of $f(x)$ on the interval $[a, a + h]$.

2. Use the following plots to sketch graphs of the equations (a) $f(x) = -\frac{1}{2}x + 1$, (b) $y = x^2$, (c) $y = \sqrt{x}$, (d) $x^2 + y^2 = 4$. Which of these expressions are functions? Which are 1-1 functions?

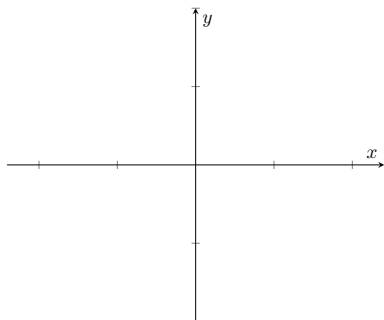
(a) $f(x) = -\frac{1}{2}x + 1$



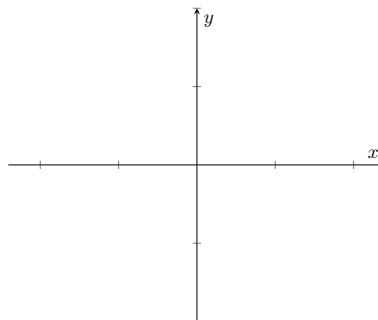
(b) $y = x^2$



(c) $y = \sqrt{x}$



(d) $x^2 + y^2 = 4$



3. Write the domain and ranges of the following equations (*Hint*: use your sketches in the previous exercise). Use both interval and set builder notation.

(a) $f(x) = -\frac{1}{2}x + 1$

Domain:

Range:

(b) $y = x^2$

Domain:

Range:

(c) $y = \sqrt{x}$

Domain:

Range:

(d) $x^2 + y^2 = 4$

Domain:

Range:

4. Find the domain of the following functions. Use both interval and set builder notation.

(a) $f(x) = \frac{x}{\sqrt{x^2 + 1}}$

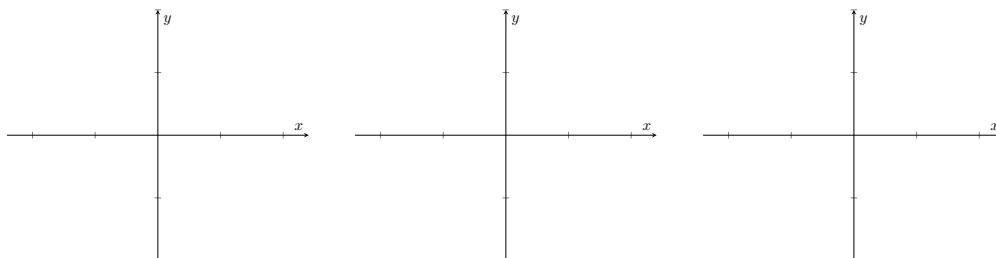
(c) $h(x) = \sqrt[4]{9 - x^2}$

(b) $g(x) = \frac{x}{\sqrt{x + 1}}$

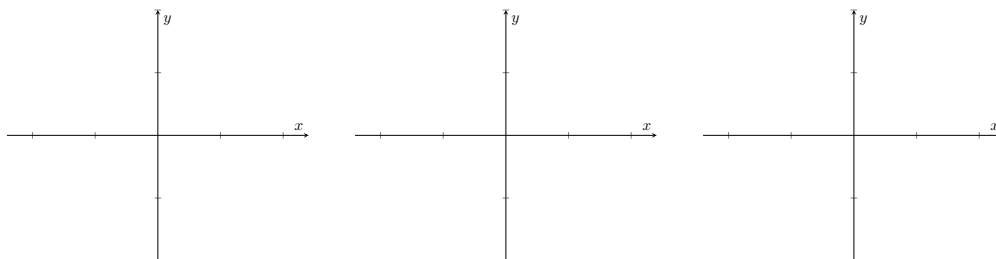
(d) $k(x) = \frac{1}{x^2 - x}$

5. In this exercise we will practice graphing piecewise functions.

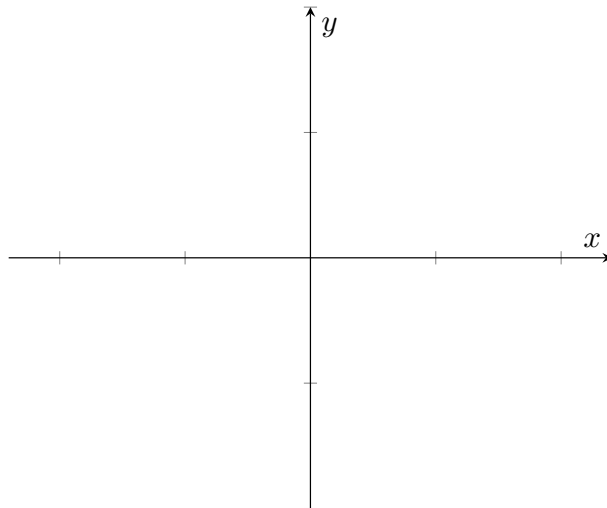
(a) Graph the functions $f(x) = 4$, $f(x) = x^2$, $f(x) = -x + 6$ on the following graphs.



(b) Using your previous plots, plot $f(x) = 4$ for $x < -2$ on the first graph, $f(x) = x^2$ for $-2 \leq x \leq 1$ on the second graph, $f(x) = -x + 6$ for $x > 1$ on the third graph.



(c) Now plot the graph of $f(x) = \begin{cases} 4, & x < -2 \\ x^2, & -2 \leq x \leq 1 \\ -x + 6, & x > 1 \end{cases}$.



(d) What is the domain and range of this function?

(e) Is this function one-to-one?