Calculus and Elements of Linear Algebra I

Homework 2

Due on Moodle, September 21, 2020

1. Draw the graphs of the following equations in two variables x and y.
   (a) $3\,x - 2\,y = 6$
   (b) $y = 5$
   (c) $(y-2)^2 = 2\,(x+1)$
   (d) $(x-1)^2 + (y-1)^2 = 4$
2. For each of the examples from Question 1, determine whether it is the graph of a function $y = f(x)$. If so, find $f(x)$, its domain, and its range.
3. For each of the examples from Question 1, determine whether it is the graph of a function $x = g(y)$. If so, find $g(y)$, its domain, and its range.
4. Let
   $$f(x) = 5^{x-2}\,.$$
   Find the inverse function of f, denoted f^{-1}, and state domain and range of f and f^{-1}.*
5. Compute the following limits.
   (a) $\lim\limits_{x\to 4} x^2 + 5\,x - 5$
   (b) $\lim\limits_{s\to 3} \dfrac{s^2-9}{s-3}$
   (c) $\lim\limits_{t\to 0} \dfrac{t^2}{t}$
   (d) $\lim\limits_{w\to 3} \dfrac{\dfrac{1}{w} - \dfrac{1}{3}}{w-3}$
   (e) $\lim\limits_{h\to 0} \dfrac{\sqrt{1+x} - \sqrt{1-x}}{x}$

*Note that f^{-1} is common symbolic notation for the inverse function. It does *not* denote the function $1/f(x)$!