

Problem Set 2

2019 Math Boot Camp for the Political and Social Sciences

Deeper Thinking

1. Consider the sets $A = \{1, 2\}$ and $B = \{a, b, c\}$. How many functions are there from A to B ? Draw them. Can this count be generalised?
2. Let $y = mx + c$ be a linear graph. What is the angle between the graph and the x -axis, measured counterclockwise from the x -axis?
3. Consider the set of points $\{(t - 1, 2t - 1) \mid t \in \mathbb{R}\}$. What graph does this correspond to?

Some practice

1. Let $f(x) = 3x + 5$. Find $f(1)$, $f(-3)$, and $f(0.7)$.
2. Let $f(x) = x^2 - 1$ and $g(x) = 2x + 2$. Find $f \circ g$. Check your answer by computing $f \circ g(4)$ via:
 - (a) Plugging 4 into your formula for $f \circ g$.
 - (b) Finding $g(4)$, then plugging the result into $f(x)$.
3. Sketch the graph of $2x + 4y = 6$.
4. Find the point of intersection of the graphs $y = 2x + 1$ and $x - 3y = 7$.
5. When little Jimmy is $t = 3$ years old, his mother measures his height to be $H = 90$ cm. When he is $t = 4$, she measures him to be $H = 110$ cm tall. He immediately bursts into tears. You see, he thinks his rate of growth is linear, $H = mt + c$.
 - (a) Compute the slope m and H -intercept c of this equation.
 - (b) Draw a graph of the equation.
 - (c) Following this, how tall would Jimmy be when he is 5 years old? 10 years old?
 - (d) How old would Jimmy be when he is taller than a 2 storey building (i.e. 8m)?
6. Read the exercises from Chapter 3 in [Moore-Siegel] and either do them or thoroughly convince yourself they're not worth your time.