# Lecture 2 - Homework

Question 1. Let $H = \{4, 6, 7, 8, 10, 12, 13, 15\}$ and $T = \{1, 2, 5, 7, 8, 10, 12, 14, 16\}$. For each function described below, draw a mapping diagram between the two sets. Also state the range of the function.

(a)
- $f : \mathcal{H} \to \mathcal{T}$.

- **rule of f:** Take each element in $\mathcal{H}$, and subtract 2.

(b)
- $F : \mathcal{H} \to \mathcal{T}$.

- **rule of F:** Take each element in $\mathcal{H}$

    - **IF** it is even, then divide it by 2

    - **ELSE** if it is odd, then subtract 1 first, then divide your result by 2.

(c)
- $g : \mathcal{H} \to \mathcal{T}$.

- **rule of g:** Take each element in $\mathcal{H}$, and double it.

(d)
- $I : \mathcal{H} \to \mathcal{T}$.

- **rule of I:** Take each element in $\mathcal{H}$, and multiply it by 1.

- (This function is really important in advanced math! Specifically linear algebra, its called the identity function).

Question 2. Let $r : \mathcal{A} \to \mathcal{B}$ be a function that maps from $\mathcal{A}$ to $\mathcal{B}$. The figure below is the mapping diagram for r. Explain why r cannot be a function.
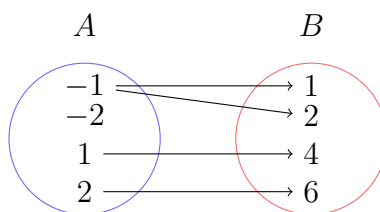
Question 3. Translate the following symbolical rules to plain English.

(a) **rule of Q:** For every element $a \in \mathcal{A}$, evaluate $Q(a) = 2a + 2$.

(b) **rule of M:** For every element $x \in \mathcal{X}$, evaluate $M(x) = \frac{x}{2} + 1$.

(c) **rule of Z:** For every element $b \in \mathcal{B}$, evaluate $Z(b) = 3b$.

(d) **rule of R:** For every element $c \in \mathcal{C}$, evaluate $R(c) = -\sqrt{c}$.

(e) **rule of S:** For every element $y \in \mathcal{Y}$, evaluate $S(y) = y^2 + y^3$.

Question 4. Textbook, Pg 22: Question 1

Question 5. Let $f(x) = 2x^2 - 5x + 3$ and $g(x) = 4x - 3$ be functions. Evaluate the following,

(a) $f(0)$ **and** $g(0)$

(b) $f(3)$ **and** $g(-8)$

(c) $f(g(-8))$

(d) $g(f(-2))$

(e) $f(f(f(0)))$

Question 6. Sketch the following functions. ALSO, state whether the vertex represents a maximum or a minimum.

(a) $t(x) = -2x^2 + 4$

(b) $f(x) = x^2 - 7x + 12$

(c) $g(x) = -3x^2 + 7x - 6$