CS23 Assignment Three

CJ Bridgman-Ford
cj.ikaika@gmail.com

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1 Is $(1, 2, 3, 4) = (1, 2, 4, 3)$?

No. *Unlike sets, the order of elements in a tuple matters.*

2 Which of the following are equivalent:

$\{a, b, c\}, \{\{a, b\}, c\}, (a, b, c), (a, (b, c)), (b, c, a),$
$\{\{a, b, c\}\}, \{b, c, a\}, \{\}, \{\{\}\}$

$\{a, b, c\}$ **is equivalent to** $\{b, c, a\}$**.** *All other tuples and sets are inequivalent due to differences in strcture or order of elements.*

3 Let $A = \{2, 3, 4\}$ and $B = \{6, 8, 10\}$ and define a relation R from A to B as follows: For every $(x, y) \in A \times B$, $(x, y) \in R$ means that $\frac{y}{x}$ is an integer.

a. Is $4R6$? Is $4R8$? Is $(3, 8) \in R$? Is $(2, 10) \in R$?

$\frac{6}{4} = 1.5$ *is not an integer.* **Therefore,** $4R6$ **is not true.** $\frac{8}{4} = 2$ *is an integer.* **Therefore,** $4R8$ **is true.** $\frac{8}{3}$ *is not an integer.* **Therefore,** $(3, 8) \in R$ **is not true.** $\frac{10}{2} = 5$ *is an integer.* **Therefore,** $(2, 10) \in R$ **is true.**

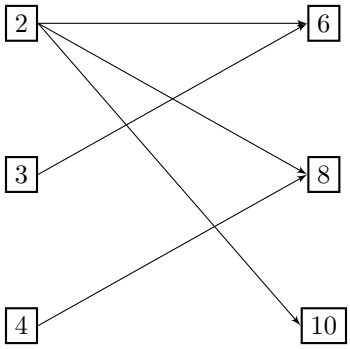
b. Write R as a set of ordered pairs.

$R = \{(2, 6), (2, 8), (2, 10), (3, 6), (4, 8)\}$.

c. Write the domain and co-domain of R.

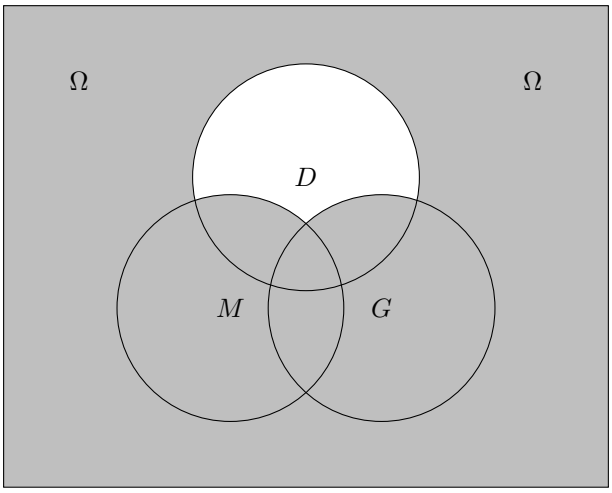
The domain of R *is* A *and the co-domain is* B.

d. Draw an arrow diagram for R.

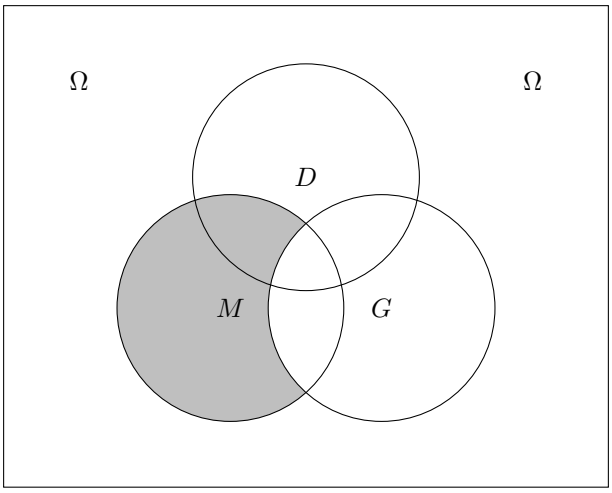


4 Given that Ω = all students in university, D = day students, M = mathematics majors, and G = graduate students, draw a venn diagram for this situation and copy it once for each of the given problems. Shade the following sets.

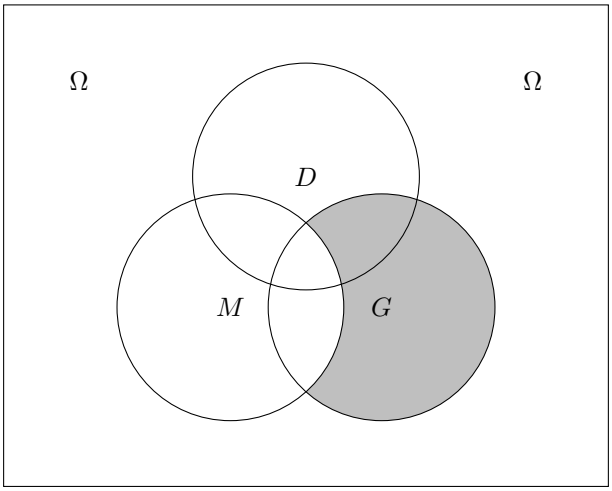
a. Evening and online students:



b. Undergraduate mathematics majors:



c. Non-math graduate students:



d. Non-math undergraduate students: