MATH 240 Assignment 1, Spring 2016

Michael Monagan

Please put your name and student ID at the top of the front page and staple your assignment together.
Please hand in to the dropoff boxes outside AQ 4135 by 6pm Tuesday January 19th.
Sorry, no late assignments are accepted.

1.1 Exercises 2, 10, 14, 23, 24.

For exercise 2 write the linear system as an augmented matrix $[A|b]$ and do elementary row operations on $[A|b]$.

1.2 Exercises 4, 10, 16, 30.

Row reduce the following agumented matrix to reduced row Echelon form. Show your working by showing the row operations you use.

$$\begin{bmatrix} 0 & 2 & 2 & 2 \\ 1 & 1 & 1 & 1 \\ 1 & 2 & 3 & 4 \end{bmatrix}$$

1.3 Exercises 6, 10, 12, 19, 20, 24, 33, 34.

For vectors $u = [1, 2]$ and $v = [2, 1]$ calculate $u + v$ and $u - v$ and draw the vectors $u, v, u - v, u + v$ in $\mathbb{R}^2$. Calculate $u.v$ and $||u||$, and the angle θ between them.
To calculate θ use the formula

$$u.v \;=\; ||u||\;||v||\;\cos\theta \text{ from page 337.}$$

1.4 Exercises 3, 4, 10, 22, 24.

1.5 Exercises 4, 6, 10, 14, 36, 40.
For exercise 40 use Theorem 5 of 1.4

Let $u = [u_1, u_2, \ldots, u_n]$ and $v = [v_1, v_2, \ldots, v_n]$ be two vectors in $\mathbb{R}^n$. Here is my proof from class that $u + v = v + u$. Use this as a model for exercises 33 and 34 of 1.3.

$$\begin{aligned} u + v &= [u_1, u_2, \ldots, u_n] + [v_1, v_2, \ldots, v_n] \\ &= [u_1 + v_1, u_2 + v_2, \ldots, u_n + v_n] && \text{by definition of vector } + \\ &= [v_1 + u_1, v_2 + u_2, \ldots, v_n + u_n] && + \text{ in } \mathbb{R} \text{ is commutative} \\ &= [v_1, v_2, \ldots, v_n] + [u_1, u_2, \ldots, u_n] && \text{by definition of vector } + \\ &= v + u \end{aligned}$$