PS 2
Due: Mon, Feb 2

I recommend that you look at problem 2 early (this is related to the
lecture for Jan 26 and associated notes). Problems 5-10 are associated with
the reading for Wednesday, Jan 28; I recommend you look at (though not
necessarily attempt) the problems before reading the relevant book sections,
and ideally before Wednesday’s lecture. You will find some of the problems
are nearly solved – or very similar problems are solved – in the chapter text.

1: By the book  Book section 4.6, problems 5–10

2: Recognizing rank  Consider the MATLAB fragment

```matlab
function [y] = ps2mult(x)
    n = length(x);
    A = reshape(1:n^2, n, n);
    y = A*x;
```

1. What is $A$ for $n = 3$?

2. Show that $A$ has rank two (independent of $n$).

3. Rewrite `ps2mult` so that it runs in $O(n)$ time.