Homework 8
due Wednesday March 8 in class

1. Biggs 27.1 # 3 page 392
2. Biggs 27.1 # 4 page 392
3. Biggs 27.2 # 1 page 395
4. Biggs 27.2 # 4 page 395

5. In the RSA encryption system choose \( n = 65 \). Find the decryption key \( d \) for \( e = 5 \) and for \( e = 7 \). For \( n = 33 \) and \( e = 3 \) encrypt the message \( M = 18 \).

6. (a) Suppose you are handed the cheap rubik box in the following configuration:

\[
\begin{array}{ccc}
18 & 15 & 16 \\
17 & 14 & 2 \\
3 & 13 & 1 \\
\end{array}
\quad
\begin{array}{ccc}
12 & 11 & 10 \\
4 & 5 & 6 \\
9 & 8 & 7 \\
\end{array}
\]

front face 
back face

Can you bring it back to the initial configuration by a finite sequence of simple moves?

(b) Now suppose that rotating the two central rectangles by 180° are also allowed moves. Can you reach the initial configuration in this case?

[Hint: Use Maple for this problem!!]