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| Purpose             | To begin to learn about Maple as a mathematical tool for linear algebra and Maple's online help system. |
| Prerequisites       | Elementary Algebra  |
| Maple commands used | help and ?  |

Notes:

- It often helps to do computer work with a partner. Help each other locate and fix typographical errors, discuss Maple's response, and ask and answer each other questions. If further experiments are needed before answering the questions, feel free to do so.
1. (a) Start Maple, then for each of the following expressions, enter the expression in a separate input region, execute it (by pressing the Enter key), and record Maple's response to your command. If the response is too long, you may summarize Maple's response. Be sure your description contains enough information for you to understand the result when you look at these answers later in the course.

$3 * 4;$

$3 * x;$

$a * b ^ 2;$

$(a * b) ^ 2;$

- (b) Explain the different results for  $a * b ^ 2;$  and  $(a * b) ^ 2;$ .

- (c) What is wrong with the following command:  $3 x^2 + 2 x - 5;$ ?

- (d) How would you enter the polynomial  $3x^2 + 2x - 5$  in Maple?

2. (a) This set of commands will introduce you to Maple's online help facility. There is a help worksheet for every Maple command (including all commands in the `linalg` and `laylinalg` packages). Each help worksheet contains a full description of the commands arguments and output and includes several examples to illustrate its usage. Read the computer responses to the following instructions, but you need not record the output. If you want to take notes for your own purposes, use a separate sheet of paper. Do not be concerned if a lot of the information in the help worksheets does not make sense (yet).

- i. `help( linalg );`
- ii. `?matrix`
- iii. `?laylinalg`
- iv. `?replace`
- v. `?scale`
- vi. `?swap`

Notes:

- When you are done with a Help window, click its close box in the upper right corner.
  - The `?` "command" is one of the few Maple commands that is not terminated with a semicolon or colon.
  - Type `?help` for some additional information about Maple's online help facility.
- (b) Give a brief description of the Maple online help facility and how to access it.

- (c) Explain how the Maple help system can be accessed via the **Help** pull-down menu.

- (d) What command needs to be executed before using a command from the `laylinalg` package?

- (e) Give the command that lists all problems in Section 1.1 for which there is Maple data. List the problems in Section 1.2 for which data is provided. (If necessary, consult the information in the online help for `laylinalg`.)

|                     |  |
|---------------------|--|
| Purpose             | To learn about the basic linear algebra commands in the <code>linalg</code> and <code>laylinalg</code> packages.   |
| Prerequisites       | Section 1.5  |
| Maple commands used | <code>evalm</code> , <code>restart</code> , and <code>with</code> ;<br><code>matrix</code> and <code>vector</code> from the <code>linalg</code> package. |

Prior to doing any linear algebra with Maple, you should load the `linalg` package. The `laylinalg` package contains several additional commands and data for a large number of exercises in the text-book; it should also be loaded in each Maple worksheet that you create for this course. It is also highly recommended that you begin every worksheet with the `restart`; command. This command removes all assignments and results from Maple's memory and restarts your Maple session. Thus, the first commands entered in every Maple worksheet should be:

```
restart;  
with( linalg );  
with( laylinalg );
```

Notes:

- To remove an assignment to a variable, say, `x`, and make `x` into a variable again, use the command: `unassign( 'x' );`.
- Be sure you use the single quote (`'`), not the back quote (```).

1. (a) For each of the following Maple commands, enter and execute the command, then record the results in the boxes provided. Remember that each command must end with a semi-colon or colon and that pressing the **Enter** key executes all commands in the current execution group. (For more about execution groups and the worksheet interface, see `?worksheet`.)

```
restart;
```

```
with(linalg);
```

```
with( laylinalg );
```

```
M := matrix( [ [1, 2, 3], [4, 5, 6] ] );
```

M;

evalm(M);

N := matrix( 2, 3, [1, 2, 3, 4, 5, 6] );

evalm(N);

N[2,3] := 7;

evalm(N);

v := vector( [1, 2, 3, 1] );

v[4];

v;

evalm(v);