

1. If  $z = [0 \ -1 \ 2 \ 4 \ -2 \ 1 \ 5 \ 3]$ , and  $J = [5 \ 2 \ 1 \ 6 \ 3 \ 8 \ 4 \ 7]$ , determine what is produced by the following sets of Matlab statements:
 

```
>> x = z', A = x×x', s = x'×x, w = x×J,
>> length(x), length(z)
>> size(A), size(x), size(z), size(s)
```
2. Determine what is produced by the Matlab statements:
 

```
>> i = 1:10
>> j = 1:2:11
>> x = 5:-2:-3
```
3. If  $z = [0 \ -1 \ 2 \ 4 \ -2 \ 1 \ 5 \ 3]$ , and  $J = [5 \ 2 \ 1 \ 6 \ 3 \ 8 \ 4 \ 7]$ , determine what is produced by the following Matlab statements:
 

```
>> z(2:5)
>> z(J)
```
4. Determine what is produced by the following Matlab statements:
 

```
>> x = linspace(1, 1000, 4)
>> y = logspace(0, 3, 4)
```
5. Chebyshev polynomials are used in a variety of engineering applications. The  $j$ th Chebyshev polynomial  $T_j(x)$  is defined by
 
$$T_j(x) = \cos(j \arccos(x)), \quad -1 \leq x \leq 1.$$
 Plot, in the same figure, the Chebyshev polynomials for  $j = 1, 3, 5, 7$ .
6. Write Matlab code that will evaluate and plot the following functions:
  - (a)  $y = 5 \cos(3 \pi x)$  for 101 equally spaced points on the interval  $0 \leq x \leq 1$ .
  - (b)  $y = \frac{1}{1+x^2}$  for 101 equally spaced points on the interval  $-5 \leq x \leq 5$ .
  - (c)  $y = \frac{\sin 7x - \sin 5x}{\cos 7x + \cos 5x}$  using 200 equally spaced points on the interval  $-1.57 \leq x \leq 1.57$ . Use the axis command to scale the plot so that  $-2 \leq x \leq 2$  and  $-10 \leq y \leq 10$ .
7. It's useful to be able to work out how the period of a bond repayment changes if you increase or decrease your monthly payment  $P$ . The formula for the number of years  $N$  to repay the loan is given by
 
$$N = \frac{\ln\left(\frac{P}{P - rL/12}\right)}{12 \ln(1 + r/12)}$$
 How long will it take to pay off the loan of \$50 000 at \$800 a month if the interest remains at 15 percent?