

1. Get help on the MATLAB function `exp` using: (a) the “`help exp`” command typed in the Command Window, (b) “`doc exp`” to display the help for `exp` directly in the Help Browser, and (c) the `helpwin` command to open the Help Browser and look up the `exp` command from there.
2. Use the `lookfor` command to determine how to take the base-10 logarithm of a number in MATLAB.
3. Calculate the results of the following expressions using the MATLAB Command Window:

(a)  $\left(\frac{1}{5^2} + \frac{3}{2}\pi - 1\right)^{-3}$

(b)  $2\pi - \pi^{0.5}$

(c)  $1 + \frac{1}{2} + \frac{1}{2^2} + \frac{1}{3^3} + \frac{1}{2^4}$

4. Suppose that  $u = 1$  and  $v = 3$ . Evaluate the following expressions using the MATLAB Command Window:

(a)  $\frac{4u}{3v}$

(b)  $\frac{2v^{-2}}{(u + v)^2}$

(c)  $\frac{v^3}{v^3 - u^3}$

(d)  $\frac{4}{3}\pi v^2$

(e)  $u\sqrt{v} + 1$

(f)  $\log_{10}\left(\frac{v + u}{v - u}\right)$

5. Suppose that  $x = 2$  and  $y = -1$ . Evaluate the following expressions using MATLAB.

(a)  $\sqrt[4]{2x^3}$

(b)  $\sqrt[4]{2y^3}$

Note that MATLAB evaluates expressions with complex or imaginary answers transparently.

6. The equation of an ellipse centered at the origin is

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \quad (1.9)$$

where  $a$  and  $b$  are distances from the center along the  $x$  and  $y$  axes, respectively. The area of this ellipse can be calculated from the equation

$$A = \pi ab \quad (1.10)$$

Use MATLAB as a calculator to calculate the area of an ellipse with  $a = 5$  and  $b = 10$ .

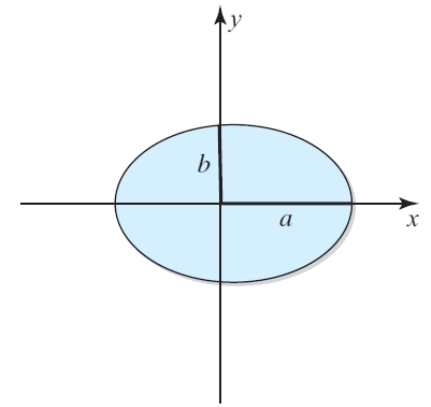
7. The circumference (perimeter) of an ellipse like the one defined in Figure 1.15 can be approximated by calculating an intermediate parameter  $h$ :

$$h = \frac{(a - b)^2}{(a + b)^2} \quad (1.11)$$

The approximate circumference can be found from  $a$ ,  $b$ , and  $h$  as:

$$C \approx \pi(a + b) \left( 1 + \frac{3h}{10 + \sqrt{4 - 3h}} \right) \quad (1.12)$$

Create a script file that defines  $a$  and  $b$ , calculates  $h$ , and then calculates the final circumference. Assume that  $a$  and  $b$  are the same values as in the previous exercise.



An ellipse centered at the origin (0, 0).

8. Answer the following questions for the array shown.

$$\text{array1} = \begin{bmatrix} 0.0 & 0.5 & 2.1 & -3.5 & 5.0 \\ -0.1 & -1.2 & -6.6 & 1.1 & 3.4 \\ 1.2 & 0.1 & 0.5 & -0.4 & 1.3 \\ 1.1 & 5.1 & 0.0 & 1.4 & -2.1 \end{bmatrix}$$

- (a) What is the size of array1?
- (b) What is the value of array1 (1, 4) ?
- (c) What is the value of array1 (9) ?
- (d) What is the size and value of array1 (:, 1:2:4) ?
- (e) What is the size and value of array1 ([1 3], [end-1 end]) ?