

**Solve the following problems by writing commands in the Command Window.**

1. Calculate:

$$(a) \frac{(14.8^2 + 6.5^2)}{3.8^2} + \frac{55}{\sqrt{2} + 14}$$

$$(b) (-3.5)^3 + \frac{e^6}{\ln 524} + 206^{1/3}$$

2. Calculate:

$$(a) \frac{16.5^2(8.4 - \sqrt{70})}{4.3^2 - 17.3}$$

$$(b) \frac{5.2^3 - 6.4^2 + 3}{1.6^8 - 2} + \left(\frac{13.3}{5}\right)^{1.5}$$

3. Calculate:

$$(a) 15 \left( \frac{\sqrt{10} + 3.7^2}{\log_{10}(1365) + 1.9} \right)$$

$$(b) \frac{2.5^3 \left( 16 - \frac{216}{22} \right)}{1.7^4 + 14} + \sqrt[4]{2050}$$

4. Calculate:

$$(a) \frac{2.3^2 \cdot 1.7}{\sqrt{(1 - 0.8^2)^2 + (2 - \sqrt{0.87})^2}}$$

$$(b) 2.34 + \frac{1}{2} 2.7(5.9^2 - 2.4^2) + 9.8 \ln 51$$

5. Calculate:

$$(a) \frac{\sin\left(\frac{7\pi}{9}\right)}{\cos^2\left(\frac{5}{7}\pi\right)} + \frac{1}{7} \tan\left(\frac{5}{12}\pi\right)$$

$$(b) \frac{\tan 64^\circ}{\cos^2 14^\circ} - \frac{3 \sin 80^\circ}{\sqrt[3]{0.9}} + \frac{\cos 55^\circ}{\sin 11^\circ}$$

6. Define the variable  $x$  as  $x = 2.34$ , then evaluate:

$$(a) 2x^4 - 6x^3 + 14.8x^2 + 9.1$$

$$(b) \frac{e^{2x}}{\sqrt{14 + x^2 - x}}$$

7. Define the variable  $t$  as  $t = 6.8$ , then evaluate:

$$(a) \ln(|t^2 - t^3|)$$

$$(b) \frac{75}{2t} \cos(0.8t - 3)$$

8. Define the variables  $x$  and  $y$  as  $x = 8.3$  and  $y = 2.4$ , then evaluate:

$$(a) x^2 + y^2 - \frac{x^2}{y^2}$$

$$(b) \sqrt{xy} - \sqrt{x+y} + \left(\frac{x-y}{x-2y}\right)^2 - \sqrt{\frac{x}{y}}$$

9. Define the variables  $a$ ,  $b$ ,  $c$ , and  $d$  as:

$$a = 13, b = 4.2, c = (4b)/a, \text{ and } d = \frac{abc}{a+b+c}, \text{ then evaluate:}$$

$$(a) a \frac{b}{c+d} + \frac{da}{cb} - (a-b^2)(c+d)$$

$$(b) \frac{\sqrt{a^2 + b^2}}{(d-c)} + \ln(|b-a+c-d|)$$

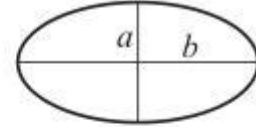
10.

Given:  $\int \cos^2(ax) dx = \frac{1}{2}x - \frac{\sin 2ax}{4a}$ . Use MATLAB to calculate the following

definite integral:  $\int_{\frac{\pi}{9}}^{\frac{3\pi}{5}} \cos^2(0.5x) dx$ .

11. The perimeter  $P$  of an ellipse with semi-minor axes  $a$  and

$b$  is given approximately by:  $P = 2\pi \sqrt{\frac{1}{2}(a^2 + b^2)}$ .



(a) Determine the perimeter of an ellipse with  $a = 9$  in. and  $b = 3$  in.

(b) An ellipse with  $b = 2a$  has a perimeter of  $P = 20$  cm. Determine  $a$  and  $b$ .

12. Two trigonometric identities are given by:

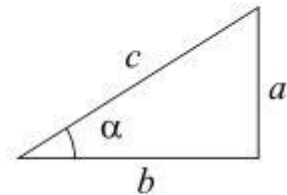
$$(a) \sin 4x = 4 \sin x \cos x - 8 \sin^3 x \cos x \quad (b) \cos 2x = \frac{1 - \tan^2 x}{1 + \tan^2 x}$$

For each part, verify that the identity is correct by calculating the values of the left and right sides of the equation, substituting  $x = \frac{\pi}{9}$ .

13. In the right triangle shown  $a = 16$  cm and  $c = 50$  cm. Define  $a$  and  $c$  as variables, and then:

(a) Using the Pythagorean Theorem, calculate  $b$  by typing one line in the Command Window.

(b) Using  $b$  from part (a) and the `acosd` function, calculate the angle  $\alpha$  in degrees by typing one line in the Command Window.



14.

The distance  $d$  from a point  $(x_0, y_0, z_0)$  to a plane  $Ax + By + Cz + D = 0$  is given by:

$$d = \frac{|Ax_0 + By_0 + Cz_0 + D|}{\sqrt{A^2 + B^2 + C^2}}$$

Determine the distance of the point  $(8, 3, -10)$  from the plane  $2x + 23y + 13z - 24 = 0$ . First define the variables  $A$ ,  $B$ ,  $C$ ,  $D$ ,  $x_0$ ,  $y_0$ , and  $z_0$ , and then calculate  $d$ .