* Solutions
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Top of Form



Bottom of Form

Top of Form

Bottom of Form

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|  | %% Module 01 |
|  |  |
|  | %% Exercise 1.1 |
|  | % Create a variable to store the atomic weight of copper ($63.55$). |
|  | atomicWeightOfCopper = 63.55 |
|  |  |
|  | %% Exercise 1.2 |
|  | myage = 21 |
|  | myage - 2 |
|  | myage + 1 |
|  |  |
|  | %% Exercise 1.10 |
|  | % Think about what the results would be for the following expressions, and then |
|  | % type them in to verify your answers. |
|  |  |
|  | %% |
|  | % 25 / 5 \* 5 |
|  | % = (25 / 5) \* 5 = 25 |
|  | 25 / 5 \* 5 |
|  |  |
|  | %% |
|  | % 4 + 3 ^ 2 |
|  | % = 4 + (3 ^ 2) = 13 |
|  | 4 + 3 ^ 2 |
|  |  |
|  | %% |
|  | % (4 + 3) ^ 2 |
|  | % = 49 |
|  | (4 + 3) ^ 2 |
|  |  |
|  | %% |
|  | % 3 \ 12 + 5 |
|  | % = (3 \ 12) + 5 = 9 |
|  | 3 \ 12 + 5 |
|  |  |
|  | %% |
|  | % 4 - 2 \* 3 |
|  | % = 4 - (2 \* 3) = -2 |
|  | 4 - 2 \* 3 |
|  |  |
|  | %% Exercise 1.11 |
|  | % Create a variable |pounds| to store a weight in pounds. Convert this to |
|  | % kilograms and assign the result to a variable |kilos|. The conversion factor |
|  | % is 1 kilogram = 2.2 pounds. |
|  | pounds = 5.7 |
|  | kilos = 2.2 \* pounds |
|  |  |
|  | %% Exercise 1.14 |
|  | %% |
|  | % The function |sin| calculates and returns the sine of an angle in radians, and |
|  | % the function |sind| returns the sine of an angle in degrees. Verify that |
|  | % calling the |sind| function and passing 90 degrees to it results in 1. What |
|  | % argument would you pass to |sin| to obtain the result of 1? |
|  | % |
|  | sind(90) |
|  | sin(pi/2) |
|  |  |
|  | %% Exercise 1.29 |
|  | % A vector can be represented by its rectangular coordinates $x$ and $y$ or by |
|  | % its polar coordinates $r$ and $\theta$. The relationship between them is given |
|  | % by the equations: |
|  | % |
|  | % $x = r \cdot \cos(\theta)$ |
|  | % |
|  | % $y = r \cdot \sin(\theta)$ |
|  | % |
|  | % Assign values for the polar coordinates to variables r and $\theta$. Then, |
|  | % using these values, assign the corresponding rectangular coordinates to |
|  | % variables $x$ and $y$. |
|  | r = 5 |
|  | theta = 1/4 \* pi |
|  | x = r \* cos(theta) |
|  | y = r \* sin(theta) |
|  |  |
|  | %% Exercise 1.19 |
|  | % Find MATLAB expressions for the following |
|  | %% |
|  | % $\sqrt{19}$ |
|  | sqrt(19) |
|  | %% |
|  | % $3^{12}$ |
|  | 3^12 |
|  | %% |
|  | % $\tan\left(\pi\right)$ |
|  | tan(pi) |
|  | tand(radtodeg(pi)) |
|  |  |
|  | %% Exercise 1.20 |
|  | % Generate a random |
|  | %% |
|  | % real number in the range (0, 20) |
|  | rand\*20 |
|  | %% |
|  | % real number in the range (20, 50) |
|  | low = 20; |
|  | high = 50; |
|  | rand\*(high-low) + low |
|  | %% |
|  | % integer in the inclusive range from 1 to 10 |
|  | randi(10) |
|  | %% |
|  | % integer in the inclusive range from 0 to 10 |
|  | randi([0, 10]) |
|  | %% |
|  | % integer in the inclusive range from 50 to 100. |
|  | randi([50, 100]) |
|  |  |
|  | %% Exercise 1.21 |
|  | % Get into a new Command Window and type rand to get a random real number. Make |
|  | % a note of the number. Then exit MATLAB and repeat this, again making a note of |
|  | % the random number; it should be the same as before. Finally, exit MAT- LAB and |
|  | % again get into a new Command Window. This time, change the seed before |
|  | % generating a random number; it should be different. |
|  | % |
|  | % TL;DR same seed used unless set by user. same seed = same random sequence. |
|  |  |
|  | %% Exercise 2.1 |
|  | % Using the colon operator, create the following row vectors: |
|  | %% |
|  | % 2 3 4 5 6 7 |
|  | 2:7 |
|  | %% |
|  | % 1.1000 1.3000 1.5000 1.7000 |
|  | 1.1000:0.2000:1.7000 |
|  | %% |
|  | % 8 6 4 2 |
|  | 8:-2:2 |
|  |  |
|  | %% Exercise 2.4 |
|  | % Using the colon operator and also the |linspace| function, create the |
|  | % following row vectors: |
|  | %% |
|  | % -5 -4 -3 -2 -1 |
|  | -5:1:-1 |
|  | linspace(-5, -1, 5) |
|  | %% |
|  | % 5 7 9 |
|  | 5:2:9 |
|  | linspace(5, 9, 3) |
|  | %% |
|  | % 8 6 4 |
|  | 8:-2:4 |
|  | linspace(8, 4, 3) |
|  |  |
|  | %% Exercise 2.5 |
|  | % Create a variable |myend| which stores a random integer in the inclusive range |
|  | % from 5 to 9. Using the colon operator create a vector that iterates from 1 to |
|  | % |myend| in steps of 3. |
|  | myend = randi([5, 9]) |
|  | 1:3:myend |
|  |  |
|  | %% Exercise 2.6 |
|  | % Using the colon operator and the transpose operator, create a column vector |
|  | % that has the values -1 to 1 in steps of 0.5. |
|  | (-1:0.5:1)' |
|  |  |
|  | %% Exercise 2.12 |
|  | % Create a variable |rows| that is a random integer in the inclusive range from |
|  | % 1 to 5. Create a variable |cols| that is a random integer in the inclusive |
|  | % range from 1 to 5. Create a matrix of all zeros with the dimensions given by |
|  | % the values of |rows| and |cols|. |
|  | rows = randi([1, 5]) |
|  | cols = randi([1, 5]) |
|  | zeros(rows, cols) |
|  |  |
|  | %% Exercise 2.20 |
|  | % Create a vector |x| which consists of 20 equally spaced points in the range |
|  | % from $-\pi$ to $+\pi$. Create a |y| vector which is $sin(x)$. |
|  | x = linspace(-pi, pi, 20) |
|  | y = sin(x) |
|  |  |
|  | %% Exercise 2.21 |
|  | % Create a 3 x 5 matrix of random integers, each in the inclusive range from -5 |
|  | % to 5. Get the sign of every element. |
|  | m = randi([-5, 5], 3, 5) |
|  | sign(m) |
|  |  |
|  | %% Exercise 2.22 |
|  | % Create a 4 x 6 matrix of random integers, each in the inclusive range from -5 |
|  | % to 5; store it in a variable. Create another matrix that stores for each |
|  | % element the absolute value of the corresponding element in the original |
|  | % matrix. |
|  | m = randi([-5, 5], 4, 6) |
|  | abs(m) |
|  |  |
|  | %% Exercise 2.18 |
|  | % Create a three-dimensional matrix and get its |size|. |
|  | m = zeros(4, 5, 2) |
|  | size(m) |