

Drill Problem #1

Function Name: rectangleMath

Inputs:

1. (*double*) The width of a rectangle
2. (*double*) The height of a rectangle

Outputs:

1. (*double*) The area of the rectangle
2. (*double*) The perimeter of the rectangle

Function Description:

Write a MATLAB function that takes in the width and height of a rectangle, and outputs the area and perimeter of that rectangle. Since geometry is not a pre-requisite for CS 1371, here are the formulas for both:

$$area = width \times height$$

$$perimeter = 2 (width + height)$$

Homework 1: Functions

Drill Problem #2

Function Name: backCalculate

Inputs:

1. (*double*) The length of “Side A” of a right triangle
2. (*double*) The length of the Hypotenuse of the same right triangle

Outputs:

1. (*double*) The length of “Side B” of the same right triangle

Function Description:

For the most part, the Pythagorean Theorem is used to calculate the hypotenuse of a right triangle given the lengths of the other two sides, “Side A” and “Side B,” and is given by the following:

$$(Side\ A)^2 + (Side\ B)^2 = Hypotenuse^2$$

Write a MATLAB function to back-calculate for the length of “Side B” of a right triangle given the lengths of “Side A” and the Hypotenuse. This will involve some simple algebraic manipulation.

Homework 1: Functions

Drill Problem #3

Function Name: quad

Inputs:

1. (*double*) The coefficient A of a quadratic polynomial
2. (*double*) The coefficient B of a quadratic polynomial
3. (*double*) The coefficient C of a quadratic polynomial

Outputs:

1. (*double*) The positive root of the polynomial
2. (*double*) The negative root of the polynomial

Function Description:

Write a function to evaluate the two roots of a quadratic polynomial. In terms of the coefficients A, B, and C, the positive and negative roots are given by:

$$\text{positive root} = \frac{-B + \sqrt{B^2 - 4AC}}{2A}$$

$$\text{negative root} = \frac{-B - \sqrt{B^2 - 4AC}}{2A}$$

Notes:

- The terms “positive root” and “negative root” only refer to which sign is used in the quadratic formula and do not actually indicate the sign of each root. Do not worry if the “positive root” output is a negative number, or vice versa.

Homework 1: Functions

Drill Problem #4

Function Name: f

Inputs:

1. (*double*) An x-value at which to evaluate $f(x)$

Outputs:

1. (*double*) The y-value of $f(x)$ evaluated for the given input

Function Description:

Write a function in MATLAB to evaluate the function, $f(x)$, shown below, for any x-value:

$$f(x) = \frac{1.17\sqrt{1 + x^{0.9}} + \sinh(x^2 - 4)}{1.6487 \exp(x^2 - g(x))}$$

Where $g(x)$ is another function of x, given by:

$$g(x) = x * |x|$$

Notes:

- The “sinh” is the hyperbolic sin. There is a built-in function in MATLAB for it.
- $\exp()$ is the exponential of whatever is contained within the parentheses, and there is also a built-in MATLAB function for this.

Hints:

- A helper function may be useful for $g(x)$.

Homework 1: Functions

Drill Problem #5

Function Name: dormTape

Inputs:

1. (*double*) The total number of blocks to tape over
2. (*double*) The fractions of blocks to be old gold
3. (*double*) The fraction of blocks to be white
4. (*double*) The fraction of blocks to be navy blue
5. (*double*) The number of blocks one roll of tape can cover

Outputs:

1. (*double*) The total cost of the project

Function Description:

You have officially moved into your new residence hall and notice that the off-white painted cinderblock walls are pretty bland, so you decide to spruce things up a little bit by covering different blocks in the wall with different color tape to make a nice geometric pattern. You want to do your pattern in old-gold, white, and navy, and you have already figured out what design you are going to make with the tape as well as how many blocks you will cover with each color. Now you need to figure out how much this project will cost.

Using the total number of blocks to tape over, the respective fractions (given as a decimal) of blocks to be a certain color, the number of blocks that one roll of tape can cover, and the prices of each color of tape given below, this function should output the total cost of buying all of the tape for this project.

Your function should also take account for an 8% sales tax, which should be calculated using the subtotal cost. You should then round your final output to the nearest cent (or hundredths decimal place).

Color of Tape	Price per Roll
Old Gold	\$4.99
White	\$2.99
Navy	\$3.99

Notes:

- You are not able to buy partial rolls of tape.
- You should not actually do this in your residence hall, just a heads up.