SRI LANKA TECHNOLOGICAL CAMPUS (SLTC)
FACULTY OF ENGINEERING

APPLIED MATHEMATICS LABORATORY: TUTE 1

Q1

Calculate:

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

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

Q2

Calculate:

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

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

Q3

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

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

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

Q4

A cube has a side of 18 cm.

(*a*) Determine the radius of a sphere that has the same surface area as the cube.

(*b*) Determine the radius of a sphere that has the same volume as the cube.

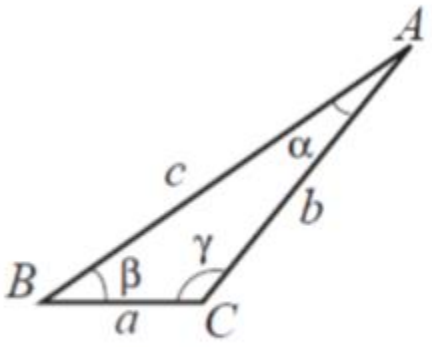
Q5

In the triangle shown $a = 9$ cm, $b = 18$ cm, and $c = 25$ cm. Define a, b, and c as variables, and then:

(*a*) Calculate the angle α (in degrees) by substituting the variables in the Law of Cosines.
(Law of Cosines: $c^2 = a^2 + b^2 - 2ab\cos\gamma$)

(*b*) Calculate the angles β and γ (in degrees)

(*c*) Check that the sum of the angles is 180°.



Q6

The current I (in amps) t seconds after closing the switch in the circuit shown is:

$$I = \frac{V}{R}(1 - e^{-(R/L)t})$$

Given $V = 120$ volts, $R = 240$ ohms, and $L = 0.5$ henrys, calculate the current 0.003 seconds after the switch is closed.