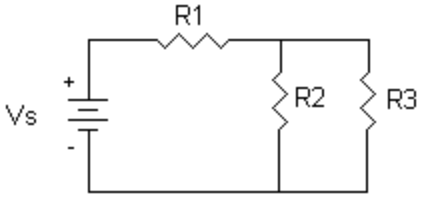
PROBLEM-SOLVING EXERCISE #2
DIVIDE AND CONQUER TECHNIQUES

PART A

Use the technique of simplifying this circuit using equivalent resistances into smaller, simpler circuits.

Given the following circuit:

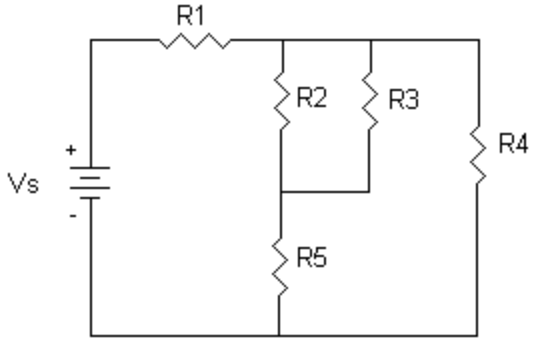


If R1 = 36 Ω, R2 = 24 Ω, R3 = 12 Ω, and Vs = 6 Volts, determine the circuit equivalent resistance (REQ) and the circuit current (I). Also calculate the branch currents through R2 and R3, and the voltage drops across R1, R2, and R3.

PART B

Use the technique of simplifying this circuit using equivalent resistances into smaller, simpler circuits.

Given the following circuit:



If R1 = 12 Ω, R2 = 24 Ω, R3 = 18 Ω, R4 = 12 Ω, R5 = 24 Ω and Vs = 12 Volts, determine the circuit equivalent resistance (REQ) and the circuit current (I). Also calculate the branch currents through R2, R3, R4, and R5, and the voltage drops across R1, R2, R3, R4 and R5.

PART C

Use the technique of separating the problem into X- and Y- components to solve this problem:

A soccer ball is kicked off the ground, with a velocity of 18 meters / second, at an upward angle of 15 degrees. Using a gravitational constant, **g**, of 9.8 meters / second^2 calculate the following:

1) The time it takes for the soccer ball to hit the ground. ***(seconds)***
2) The maximum height the soccer ball achieves. ***(meters)***
3) The distance the soccer ball travels before it hits the ground. ***(meters)***

PART D

Use the technique of separating the problem into X- and Y- components to solve this problem:

A Halloween prankster throws an egg out the window of an office building down onto the parking lot below. The egg is thrown with a velocity of 10 meters / second, at an upward angle of 37 degrees, and is release exactly 65 meters above the surface of the parking lot. The egg lands on the roof of a parked SUV, 2 meters above the surface of the parking lot.
Using a gravitational constant, **g**, of 9.8 meters / second^2 calculate the following:

1) The time it takes for the egg to hit the parked SUV. ***(seconds)***
2) The total distance away from the building that the egg lands. ***(meters)***

PROBLEM SOLVING DELIVERABLES

You should work in teams of either two or three. You may <u>not</u> work alone. Turn in your results for Parts A, B, C and D and your team's signed cover page at the beginning of your team's lecture on Wednesday, October 12, 2022 for Professor Siadat's lecture or Thursday, October 13, 2022 for Professor Hanna's lecture. One set of results should be submitted per team.