

Faculty of Engineering and Technology

Electrical and Computer Engineering Department

Electromagnetics 1 (ENEE 3408)

**Assignment #1 Vector Analysis**

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**Section No. 1**

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**Question**: Given the vectors

Find:

1. The dot product
2. The projection of on
3. The angle between and
4. Write a MATLAB program to verify your answer

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1. The dot product of the two vectors can be calculated by :
2. The projection of on is calculated using the following formula:
3. The angle between and can be calculated from the dot product formula:

So now we just need to substitute the numbers in the equation

1. The following MATLAB code verify the previous answers:

O = [0 0 0]; %the origin

R1 = [1 2 3]; %vector R1

R2 = [3 2 1]; %vector R2

Dot\_Product1 = dot(R1,R2) %the dot product of the two vectors

Dot\_Product2 = dot(R2,R2); %the dot product of R2 vector with itself

Proj = (Dot\_Product1/Dot\_Product2)\*R2 %the projection of R1 ON R2

Mag\_R1 = norm(R1); %the magnitude of R1

Mag\_R2 = norm(R2); %the magnitude of R2

Cos\_theta = Dot\_Product1/(Mag\_R1\*Mag\_R2); %the cos of the angle

 between R1 and R2

Theta = acosd(Cos\_theta) %the angle between R1 and R2

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Answers:

Dot\_Product1 = 10

Proj = (2.1429 1.4286 0.7143)

Theta = 44.4153