Answer on Question #46815 – Math – Vector Calculus

Given that:

$$r_1 = 6i - 8j + 2k, r_2 = 4i + 5j + 7k, r_3 = -2i + j + 6k$$

Find (r_1, r_2).

Solution

The scalar (or dot) product (r_1, r_2) of vectors

$$r_1 = a_1 i + a_2 j + a_3 k, r_2 = b_1 i + b_2 j + b_3 k,$$

can be computed by the following formula:

$$(r_1, r_2) = a_1 b_1 + a_2 b_2 + a_3 b_3.$$

In our case

$$r_1 = 6i - 8j + 2k, r_2 = 4i + 5j + 7k$$

and so

$$(r_1, r_2) = 6 \cdot 4 + (-8) \cdot 5 + 2 \cdot 7 = 24 - 40 + 14 = -2.$$

Answer: -2.