

**Answer on Question #58210 – Math – Vector Calculus**

**Question**

Determine whether the vectors  $u$  and  $v$  are parallel, orthogonal, or neither.

$$u = \langle 6, -2 \rangle, v = \langle 8, 24 \rangle$$

- a. Neither
- b. Parallel
- c. Orthogonal

**Solution**

Vectors  $u = \langle 6, -2 \rangle$  and  $v = \langle 8, 24 \rangle$  are orthogonal, because their scalar (dot) product is equal to zero:

$$(u, v) = 6 \cdot 8 + (-2) \cdot 24 = 48 - 48 = 0.$$

Vectors  $u = \langle 6, -2 \rangle$  and  $v = \langle 8, 24 \rangle$  are not parallel, because their coordinates are not proportional:

$$\frac{6}{8} \neq \frac{-2}{24} \text{ (indeed, } \frac{3}{4} \neq \frac{-1}{12} \text{)}.$$

**Answer:** c. Orthogonal.