

# MATH 105 SOLUTION KEYS

MURAT KOLOGLU

## 1. HOMEWORK 1

### 1.1. Section 1.1. Complete the computations

#### 1.1.1. Exercise (1).

$$(-21, 23) - (?, 6) = (-25, ?)$$

We are asked to solve for the question mark entries. We know that for a vector equation to be true, each 'slot' of the vectors on both sides of the equation must be equal. First, let's do the vector addition so we can compare two vectors across the equals sign. I will name the question marks  $?_1$  and  $?_2$  to avoid confusion.

$$\begin{aligned}(-21, 23) - (?_1, 6) &= (-25, ?_2) \\ (-21 - ?_1, 23 - 6) &= (-25, ?_2)\end{aligned}$$

Now, the above statement is actually two equations:

$$-21 - ?_1 = -25$$

and

$$23 - 6 = ?_2.$$

So,  $?_1 = 4$  and  $?_2 = 17$ .

#### 1.1.2. Exercise (4).

$$(2, 3, 5) - 4\mathbf{i} + 3\mathbf{j} = (?, ?, ?)$$

Similarly to the previous exercise, this is also in fact three equations. Recall that  $\mathbf{i} = (1, 0, 0)$  and  $\mathbf{j} = (0, 1, 0)$ . Then we can simplify expression as

$$\begin{aligned}(2, 3, 5) - 4(1, 0, 0) + 3(0, 1, 0) &= (?, ?, ?) \\ (2 - 4, 3 + 3, 5) &= (?, ?, ?) \\ (-2, 6, 5) &= (?, ?, ?).\end{aligned}$$

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Thus each of the question marks correspond to  $-2$ ,  $6$  and  $5$ , in respective order.