MATH 1920, Fall 2017
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Sections: 201, 202

Name:________________________

Section 13.1-Section 13.2 Review

Brief Summary of 13.1 (see full summaries at the end of each section in the course textbook.)

- A *vector* $v = \overrightarrow{PQ}$ is determined by a base point P (the "tail") and a terminal point Q (the "head").
- Components of $v = \overrightarrow{PQ}$, where $P = (a_1, b_2)$ and $Q = (a_2, b_2)$ are denoted:

$$v = \langle a, b \rangle$$

with $a =$________________ and $b =$________________

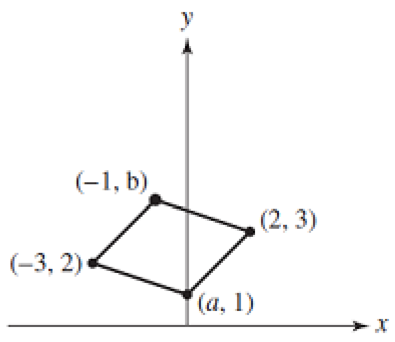
- Length or magnitude is given by: $||v|| =$______________________.
- The position vector of $P_0 = (a, b)$ is ____.
- Two vectors are *equivalent* if they have the same ________________ and ________________.
- Nonzero vectors are equivalent if and only if ____________________________.
- The unit vector in the direction of $v \neq 0$ is: ________________.
- If $\langle v_1 . v_2 \rangle$ makes an angle of θ with the positive $x-$ axis, then $v_1 =$ ________________, $v_2 =$ ________________, and $e_v =$ ________________.
- The standard basis vectors: **i**= ________________ and **j**= ________________.

Section 13.1 Additional Exercises

1. Sketch the vectors $\overrightarrow{AB}$ and $\overrightarrow{PQ}$ and determine whether they are equivalent; $A = (1, 1), B = (3, 7), P = (4, -1)$, and $Q = (6, 5)$.

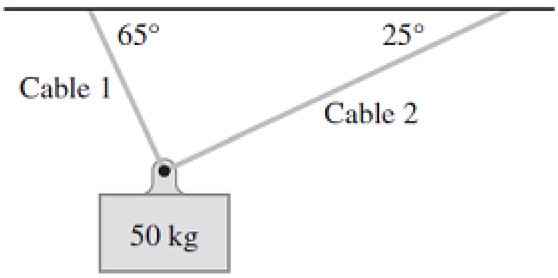
2. Find a vector of length 2 in the direction opposite to $\boldsymbol{v} = \boldsymbol{i} - \boldsymbol{j}$.

3. What are the coordinates a and b in the parallelogram in the figure (B) below?



(B)

4. Calculate the magnitude of the force on cables 1 and 2 in the figure below.



Brief Summary of 13.2

- The equation of a sphere of radius R in $\mathbb{R}^3$ and centered at (a, b, c) is ________________________.
- The equation of a cylinder of radius R in $\mathbb{R}^3$ with vertical axis through $(a, b, 0)$ is ________________________.
- Equations for the line through $P_0 = (x_0, y_0, z_0)$ with direction vector $v = \langle a, b, c \rangle$:

  vector parametrization:

  parametric equations:

Section 13.2 Additional Exercises

1. Find a vector parametrization for the line that passes through $P = (1, 2, -8)$, with the direction vector $v = \langle 2, 1, 3 \rangle$.

2. Find a parametrization of the line through $P = (4, 9, 8)$ perpendicular to the $yz-$ plane.

3. Show that $r_1(t)$ and $r_2(t)$ define the same line, where

$$r_1(t) = \langle 3, -1, 4 \rangle + t\langle 8, 12, -6 \rangle$$

$$r_2(t) = \langle 11, 11, -2 \rangle + t\langle 4, 6, -3 \rangle$$

4. Determine whether the lines $r_1(t) = \langle 0, 1, 1 \rangle + t\langle 1, 1, 2 \rangle$ and $r_2(t) = \langle 2, 0, 3 \rangle + t\langle 1, 4, 4 \rangle$ intersect and if so, find the point of intersection.