Name: Y. Lamontagne
Student ID: _____

Quiz 8

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

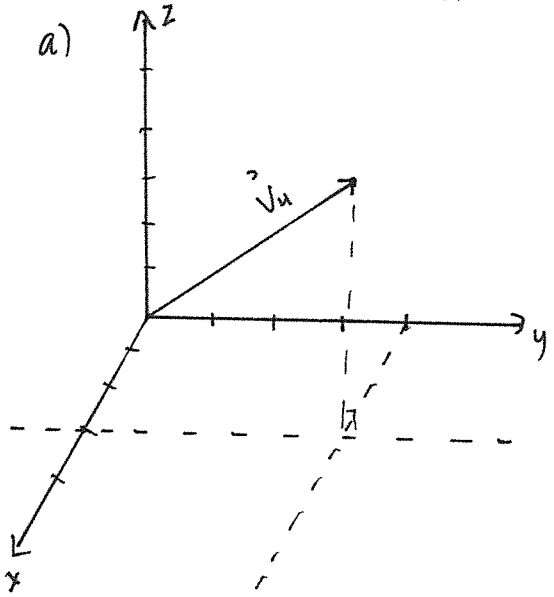
Question 1. §3.1

a. #3d *(1 mark)* Sketch the following vectors $\vec{v_4} = (3,4,5)$ with the initial points located at the origin.

b. #10b *(2 marks)* Find the terminal point of the vector that is equivalent to $\vec{u} = (1,1,3)$ and whose inital point is $A(0,2,0)$.

c. #22b *(2 marks)* For what value(s) of t, if any, is the given vector $(8t,2t)$ is parallel to $\vec{u} = (4,-1)$?

a)



b) $\vec{AB} = \vec{u}$

$B - A = (1,1,3)$

$B = (1,1,3) + A$

$= (1,1,3) + (0,2,0) = (1,3,3)$

c) $(8t,2t) = K\vec{u}$

$(8t,2t) = K(4,-1)$

$(8t,2t) = (4K,-K)$

$8t = 4K$ ① $\quad 2t = -K$

$t = \frac{-K}{2}$ ② sub ② into ①

$8\left(\frac{-K}{2}\right) = 4K$

$-4K = 4K$

$K = 0$

$\therefore$ no t values.

Question 2. §3.2

a. *(2 marks)* #20d Find a unit vector that is oppositely directed to the given vector $(-3,1,\sqrt{6},3)$.

b. *(3 marks)* #23d Find the cosine of the angle θ between $\vec{u} = (-2,2,3)$ and $\vec{v} = (1,7,-4)$.

a) Let $\vec{v} = (-3,1,\sqrt{6},3)$

$$\frac{-\vec{v}}{\|\vec{v}\|} = \frac{-(-3,1,\sqrt{6},3)}{\sqrt{(-3)^2+1^2+(\sqrt{6})^2+3^2}}$$

$$= \frac{(3,-1,-\sqrt{6},-3)}{\sqrt{9+1+6+9}}$$

$$= \frac{(3,-1,-\sqrt{6},-3)}{\sqrt{25}}$$

$$= \left(\frac{3}{5}, \frac{-1}{5}, \frac{-\sqrt{6}}{5}, \frac{-3}{5}\right)$$

b) $\vec{u} \cdot \vec{v} = \|\vec{u}\|\|\vec{v}\| \cos\theta$

$-2(1)+2(7)+3(-4) = \sqrt{(-2)^2+2^2+3^2}\sqrt{1^2+7^2+(-4)^2}\cos\theta$

$0 = \cos\theta$