NAME _____

MATH 114: FALL 2021 TAKEHOME QUIZ 7 (15PTS)

Show your work. Note, there is bonus possible if you get all correct.

Problem 1: (4pts) Find the standard angle (in degrees) and magnitude of each of the following vectors:

(a.) $\vec{A} = \langle 2, 2 \rangle$

(b.) $\vec{B} = \langle -1, 3 \rangle$

(c.) $\vec{C} = \langle -2, -5 \rangle$

(d.) $\vec{D} = \langle 0, -6 \rangle$

Problem 2: (4pts) Find the vector $\vec{A}$ given the magnitude A and standard angle θ as follows:

(a.) $A = 2$, $\theta = 45^o$,

(b.) $A = 4$, $\theta = 120^o$,

(c.) $A = 10$, $\theta = 240^o$,

(d.) $A = 6$, $\theta = -30^o$,

Problem 3: (3pts) Find the angle between the vectors given below. Decide if the following vectors are parallel, perpendicular or neither.

(a.) $\vec{A} = \langle 1, 1, 1 \rangle$ and $\vec{B} = \langle 2, 0, -2 \rangle$,

(b.) $\vec{A} = \langle 1, 1 \rangle$ and $\vec{B} = \langle 3, 3 \rangle$

(c.) $\vec{A} = \langle 1, 3, 4 \rangle$ and $\vec{B} = \langle 5, 0, -3 \rangle$

Problem 4: (1pts) If $\vec{A}$ has magnitude 10 and $\theta = 30^o$ and $\vec{B} = \langle -3, 6 \rangle$ then find $\vec{A} + \vec{B}$.

Problem 5: (1pts) Suppose a vector $\vec{A}$ make angle $\alpha = 30^o$ with the positive x-axis and angle $\beta = 60^o$ with the positive y-axis and angle $\gamma = 45^o$ with the positive z-axis. Find the unit-vector in the direction of $\vec{A}$.

Problem 6: (1pts) Suppose $\vec{A}$ has length 6 and $\vec{A} \bullet \widehat{x} = 1$ and $\vec{A} \bullet \widehat{y} = -2$. Find all such $\vec{A}$.

Problem 7: (6pts) Calculate the cross-product and dot-product of the vectors given below:

(a.) $\vec{A} = \langle 1, 3, 7 \rangle$ and $\vec{B} = \langle 2, 0, -2 \rangle$,

(b.) $\vec{A} = \langle 1, 0, 0 \rangle$ and $\vec{B} = \langle 3, 4, 5 \rangle$

(c.) $\vec{A} = \langle 1, 2, 2 \rangle$ and $\vec{B} = \langle 0, 1, -1 \rangle$

Problem 8: (2pts) Let $P = (1, 3, 0)$ and $Q = (5, 2, 1)$ and $R = (3, 4, 6)$. Find the interior angles and the area of the triangle PQR. *hint: use vectors*