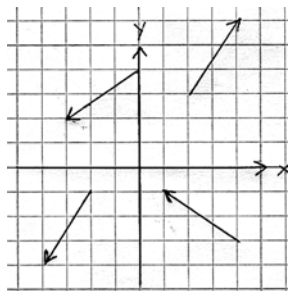
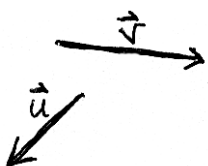


Instructions: No books or notes allowed. Do not talk to, give or receive help from anyone. Show all of your work. Put your final answer in the appropriate space.

1 [2 points] Which of the following directed line segments represents a vector with components  $\langle -3, 2 \rangle$ ? Clearly circle the best answer.



2 [6 points] (a) Draw the vector  $-2\vec{u}$ . (b) Draw the vector  $\vec{u} - \vec{v}$ . Clearly label and circle your final answer (the labeled arrow) for both (a) and (b).



Answer (a):

Answer (b):

3 [12 points] Let  $\vec{a} = \langle 2, 1 \rangle$  and  $\vec{b} = \langle 3, -1 \rangle$ .

(a) Find  $\|\vec{b}\|$ .

Answer: \_\_\_\_\_

(b) Find the direction angle of  $\vec{a}$  in degrees (to the nearest degree).

Answer: \_\_\_\_\_

(c) Find the components of a unit vector along the same direction as  $\vec{a}$ .

Answer: \_\_\_\_\_

(d) Calculate  $\vec{a} \cdot \vec{b}$

Answer: \_\_\_\_\_

(e) Calculate the angle  $\theta$  between  $\vec{a}$  and  $\vec{b}$ . Give your answer in degrees with  $0^\circ \leq \theta \leq 180^\circ$ .

Answer: \_\_\_\_\_