

Math 0220 Sample Final 2

1. Let $\vec{a} = \langle 2, 1 \rangle$ and $\vec{b} = \langle 1, 3 \rangle$.

(3 pts.)

1a. Evaluate $|\vec{a} + \vec{b}|$

(3 pts.)

1b. Find the unit vector in the direction of \vec{b} .

(4 pts.)

1c. Find all values of t such that \vec{a} is perpendicular to $\vec{c} = \langle -4, 8t \rangle$.

(5 pts.)

- 2a. Give a parametric vector equation for a circle of radius 9 with the center at the point $(1, -2)$.

(5 pts.)

- 2b. The trajectory of an object is determined by

$$\vec{r}(t) = \langle 2t, -2t^2 + 16t \rangle \text{ where } -\infty < t < \infty.$$

Eliminate the parameter t and find an equation in x and y that describes the curve on which the object moves.

3. Let $f(x) = x(x - 1)^2$, $-\infty < x < \infty$.

(10 pts.)

3a. Find all points where f has a local maximum or local minimum. Justify your answers.

(10 pts.)

3b. Find all inflection points. Justify your answer.

(10 pts.)

3c. Graph the function.