Name_____

Place your answer(s) in the space provided. You must show your work to receive credit.

Note: There is <u>NO</u> <u>partial</u> <u>credit</u> for problems 1-3.

(8 pts) 1. Express the complex number 7 + 5i in trigonometric form.

(8 pts) 2. Find the smallest positive angle θ, to the nearest tenth of a degree, from the positive x-axis to the vector if $\vec{a} = \langle -5, 8 \rangle$

(8 pts) 3. If $\vec{a} = \langle 7, -8 \rangle$ and $\vec{b} = \langle -2, 7 \rangle$, find $5\vec{a} - 7\vec{b}$.

Name_____

Place your answer(s) in the space provided. You must show your work to receive credit.

(10 pts) 4. Find an equation of a rational function f that satisfies the following conditions:
vertical asymptote: x = – 2
horizontal asymptote: y = 3
x-intercept: – 4, hole at x = 1

(10 pts) 5. If $\vec{a}$ = 120 lbs at 130^0 and $\vec{b}$ = 85 lbs at 75^0, approximate the magnitude of the resultant vector to the nearest tenth of a pound.

(16 pts) 6. Find the equations of any vertical and horizontal asymptotes and find any x and y-intercepts for the function below. Write "none" in any answer box where appropriate.

$$f(x) = \frac{-x^2 - x + 6}{x^2 + 3x - 4}$$

Vertical asymptote(s) =	
Horizontal asymptote(s) =	
x-intercept(s) =	
y-intercept(s) =	

Name_____

Place your answer(s) in the space provided. You must show your work to receive credit.

(14 pts) 7. If $\vec{a} = \langle 8, -3 \rangle$ and $\vec{b} = \langle 2, -7 \rangle$, determine

a) the dot product of the two vectors.

b) the angle between the two vectors. (Round your answer to the nearest degree and minute.)

(12 pts) 8. If $\vec{a} = \left\langle \frac{1}{2}, -3 \right\rangle$ and $\vec{b} = \langle -2, 12 \rangle$, are $\vec{a}$ and $\vec{b}$ parallel, perpendicular or neither?

(Remember to show work to justify your answer.)

Name_____

Place your answer(s) in the space provided. You must show your work to receive credit.

(14 pts) 9. A ship is traveling at 40 mi/hr in the direction N 55^0 E. The current is 12 mi/hr in the direction S 23^0 E. Find the true speed of the ship, that is, find the magnitude of the resultant vector, rounded to the nearest whole mi/hr. (Draw and label a sketch, write an equation(s) and solve.)