

Name \_\_\_\_\_

Place your answers in the space provided. You must show your work to receive credit.

- (10 pts) 1. Determine the trigonometric form for  $4 + 8i$ . Use radians for  $\theta$  and round all answers to the nearest tenth.

$4 + 8i =$

- (10 pts) 2. For the vectors  $a = \langle -2, 5 \rangle$  and  $b = \langle 2, 2 \rangle$ , find the magnitude of  $5a - 2b$ .

Magnitude =

- (10 pts) 3. Find an equation in  $x$  and  $y$  for the curve whose parametric equations are  $x = -3t$ ,  $y = 2t^2 + 1$  for any real number  $t$ .

Equation:

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- (10 pts) 4. Find the angle,  $\theta$ , between the vectors  $\langle -3, 4 \rangle$  and  $\langle 1, 3 \rangle$ . Round your answer to the nearest tenth of a degree.

=

- (10 pts) 5. Find an equation for the parabola with axis parallel to the y-axis, vertex  $(2, -3)$  and passing through the point  $(-2, -2)$ .

Equation:

- (10 pts) 6. Find the center and vertices of the conic given by  $9x^2 - 4y^2 - 54x - 16y + 29 = 0$ .

Center:

Vertices:

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- (12 pts) 7. An airplane leaves Purdue International Airport at 10:00 a.m. and travels in the direction  $75^\circ$  at 175 mi/hr. At 10:30 a.m. a second airplane leaves the same airport and travels in the direction  $185^\circ$  at 135 mi/hr. At 12:00 noon, how far apart are the airplanes? Round your answer to the nearest mile. (Draw and label a sketch, set up an equation(s) and solve.)

Distance =

- (12 pts) 8. An arch of a bridge is semi-elliptical with horizontal major axis. The base of the arch is 40 feet across. The height of the arch 8 feet from the center of the base is 14 feet. Find the height of the arch at the center of the bridge. Round your answer to the nearest tenth of a foot. (Draw and label a sketch, set up an equation(s) and solve.)

Height =

Name \_\_\_\_\_

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- (16 pts) 9. Find all asymptote(s), intercept(s) and sketch the given function. If there is none for any part, write none in the space for the answer.

$$f(x) = \frac{x - 3}{x^2 - 4x - 5}$$

Horizontal Asymptote(s):

Vertical Asymptote(s):

x-intercept(s):

y-intercept(s):


