

Pre-calculus Unit 6: Parametric Equations, Vectors , and Polar (7.5 ,8.1, 9.1-9.3)

| Monday | Tuesday | Wednesday | Thursday | Friday |
|---|--|---|---|--|
| 4/20 7.5 Parametric Equations HW#57 Pg 469 1-15 odd | 4/21 7.5 Cont. HW #58 Pg 469 15,16,19,33, 45-48 all, 49,51 | 4/22 Projectile Motion p.467 HW #60 WS | 4/23 8.1 Intro to Vectors HW#59 Pg 488 7-12 | 4/24 Rev and Quiz HW #61 Page 471 60-70 all, 73 |
| 4/27 9.1-9.2 Polar Coordinates HW #62 Pg 538 1-5 odd, 23,27, Pg 548 9,11,19 | 4/28 (9.2 cont) HW #63 Page 548 25,35-41 odd, 47, 49 | 4/29 9.3 Polar and Rect. Forms HW #64 Page 557 1, 3,26-29 all, 36-39 all, 47, 61-64 all | 4/30 (9.3 cont) HW #65 Page 560 Mid Chapter Quiz 10-19, 28,29 | 5/1 HW #66 Review Worksheet |
| 5/4 Review Session | 5/5 Test Parametric, Vectors, and Polar (Text sections 7.5, 8.1, 9.1-9.3) | | | |

NC Objectives

- 1.03 Operate with vectors in two dimensions to model and solve problems.
- 2.05 Use polar equations to model and solve problems.
- a) Solve using graphs and algebraic properties.

Which equation is the rectangular form of the polar equation $r = \frac{2}{1 + \cos \theta}$?

Released NC Final Exam Questions

- A $x^2 + 4y = 4$
- B $x^2 + y^2 = 4$
- C $y^2 + 4x = 4$
- D $y^2 - 4x = 4$

The polar coordinates of a point are $(6, \frac{4\pi}{3})$. What are the rectangular coordinates of the point?

- A $(3, -3\sqrt{3})$
- B $(3, 3\sqrt{3})$
- C $(-3, -3\sqrt{3})$
- D $(-3, 3\sqrt{3})$

Parametric Equations

Vocabulary/Concepts/Skills:

- Parameter
- Parametric Plots
- Translate between Parametric and Rectangular Forms
- Dependent/Independent Variable
- Motion over Time

Example 2: A batter at spring training camp hits a baseball with an initial velocity of $90 \frac{ft}{sec}$ at an angle of 35° from the horizontal. Assume that the batter makes contact with the ball 2.5 ft above home plate.

- a. Write parametric equations to model the motion of the ball.

$$x(t) =$$

$$y(t) =$$

- b. How high is the ball after 1.5 seconds?
c. How far away is the ball after 0.7 seconds?
d. What is the maximum height reached by the ball?
e. What is the total horizontal distance the ball travels?
f. How much time elapsed between the ball being hit and landing on the ground?
g. The outfield fence is 12ft high and 225ft from home plate. Did the batter hit a homerun? Defend your answer.

Vectors

Vocabulary/Concepts/Skills:

- Magnitude
- Addition/Subtraction of vectors
- Scalar multiplication
- Direction
- Resultant vector

Example 1: A pilot flies a plane due west for 150 miles, then turns 42° north of west for 70 miles. Find the plane's resultant distance and direction from the starting point.

Polar Equations

Vocabulary/Concepts/Skills:

- Polar Coordinate System
- Magnitude
- Translate between Rectangular and Polar Coordinates
- Pole
- Direction
- Graphing Technology
- Radius
- Argument

Example 4: Convert the following equation from polar to rectangular form.

$$r = 6 \cos \theta$$

Example 5: Convert the following equation from rectangular to polar form.

$$\frac{x^2}{25} + \frac{y^2}{16} = 1$$

Example 6: Given the equations below:

1) $4x^2 + 8y^2 - 8x + 48y + 44 = 0$

2) $y^2 - 12x + 18y + 153 = 0$

- a. Identify the conic and write each equation in rectangular form.
b. Write each equation in polar form.