precalc notes 9.4

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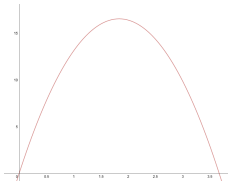
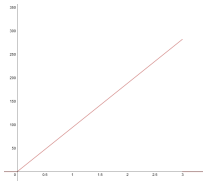
Parametric Equations

Imagine graphing the path of a golf ball.

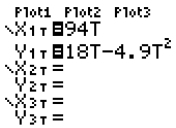
If we graph height with respect to time, we get a graph something like this:

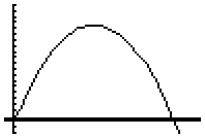


If we graph horizontal distance with respect to time, we get this:



Both graphs have value, but neither shows the full picture. Parametric equations allow us to graph both horizontal and vertical distances with respect to time.





1) Graph the parametric equation and rewrite as a rectangular equation. Also graph the rectangular equation.

$x = t + 1$
$y = t^2$

2) Use a calculator to sketch the graph. Also, convert to rectangular form.

a. $x = T - 4$
$y = 3T - 5$

b. $x = \frac{1}{2}T$
$y = T^2$

c. $x = T^2$
$y = -5\log T$

3) Graph on calculator. Find the vertices and co-vertices. Also, convert into rectangular form.

a. $x = 3 \sin \theta$
$y = 5 \cos \theta$

b. $x = 5 + \tan T$
$y = -1 + 3 \sec T$

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4) For each of the following, find the rectangular equation then convert to parametric.

a. The line segment from (3, -4) to (6, 5).

b. The circle with center (6, -3) and radius 4.

c. The ellipse with foci (4, 3) and (4, 13) and co-vertices (-8, 8) and (16, 8).

d. The conic with vertices (3, 3) and (-5, 3) and foci (4, 3) and (-6, 3).