$X =$ _____

$Y =$ _____

Find a parametrizations for the curve.

A) The line through the points A = (-2, 3) (Initial point) and B = (3, 6)

$X =$ Initial value $+ \Delta_x t$

$X = -2 + (3-(-2))t$

$= -2 + 5t$

$Y =$ Initial $+ \Delta_y t$

$y = 3 + (6-3)t$

$y = 3 + 3t$

$X = -2 + 5t$

$y = 3 + 3t$

$-\infty < t < \infty$

B) The line segment with endpoints A = (-1, 5) ($t=0$) and B = (2, 11) ($t=?$)

$X = In + \Delta_x t$

$X = -1 + (2-(-1))t$

$X = -1 + 3t$

$y = In + \Delta_y t$

$y = 5 + (11-5)t$

$= 5 + 6t$

$2 = -1 + 3t$

$3 = 3t$

$t = 1$

$11 = 5 + 6t$

$6 = 6t$

$t = 1$

$X = -1 + 3t$

$Y = 5 + 6t$

$0 \le t \le 1$

37. Ben can sprint at the rate of 20ft/sec. Jerry sprints at 15ft/sec. Ben gives Jerry a 15ft head start. The following parametric equations can be used to model a race.

Ben: $x_1 = 20t - 15$ $y_1 = 2$ Jerry: $x_1 = 15t$ $y_1 = 4$

a) Find a viewing window to simulate a 100 yard dash. Graph simultaneously with t starting at t = 0 and Tstep = .05.

b) Who is ahead after 2 seconds? 3seconds? 4 seconds?

Famine Relief Air Drop: A relief agency drops food containers form an airplane on a war torn famine area. The drop was made from an altitude of 2000 feet above ground level.

A) Use an equation to model the height of the containers (during free fall) as a function of time t.

$Y = -16t^2 + V_0 t + H_0$ $X = 2$ $Y = -16t^2 + 2000$

b) Use parametric mode on your calculator to simulate the drop during the first 6 seconds.

c) After 5 seconds of free fall, parachutes open. How many feet above the ground are the food containers when the parachutes open?

Height of a pop-up: A baseball is hit straight up form a height of 4 feet with an initial velocity of 70 ft/sec.

a) Write an equation that models the height of the ball as a function of time. $y = -16t^2 + 70t + 4$

$x = 2$

b) Use parametric mode to simulate the pop-up.

c) Use parametric mode to graph height against time. (Let x(t) = t)

d) How high is the ball after 3 seconds?

70 ft

e) What is the maximum height of the ball? How many seconds does it take to reach its maximum height? 80 ft 2 sec

Hitting a baseball: Kevin hits a baseball at 3 feet above the ground with an initial speed of 150ft/sec at angle of 18 degrees with the horizontal. Will the ball clear a 20 feet wall that is 400 feet away?

$x = 150\cos 18t$

$y = -16t^2 + 150\sin 18t + 3$

$x = v_0 \cos\theta t$

$y = -16t^2 + v_0 \sin\theta t + h_0$

$20 = -16t^2 + 150\sin 18t + 3$

$0 = -16t^2 + 150\sin 18t - 17$

$= -16t^2 + 46.35t - 17$

$a \quad b \quad c$

$$t = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{-46.35 \pm \sqrt{(46.35)^2 - 4(-16)(-17)}}{2(-16)}$$