Name_____

Ideal Projectile Motion

Date_____ Period_____

1) A soccer ball is kicked across a field at an angle of 30° with an initial speed of 16 m/s. Write a set of parametric equations for the motion of the soccer ball.

2) A golf ball is struck across a flat fairway at an angle of 45° with an initial speed of 136 ft/s. Write a set of parametric equations for the motion of the golf ball.

3) A snowball is thrown at an angle of 60° with an initial speed of 45 ft/s and an initial height of 5 ft. Write a set of parametric equations for the motion of the snowball.

4) A cannon ball is fired across a flat field at an angle of 45° with an initial speed of 103 ft/s and an initial height of 31 ft.
   i) Write a set of parametric equations for the motion of the cannon ball.
   ii) Determine how long the cannon ball was in the air.
   iii) Determine how far the cannon ball traveled in the air.
   iv) Determine when the cannon ball reached its maximum height.
   v) Determine the maximum height reached by the cannon ball.
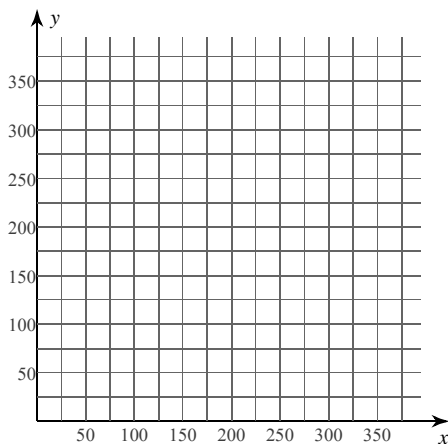   vi) Sketch the graph of the parametric equations.

Ideal Projectile Motion

1) A soccer ball is kicked across a field at an angle of 30° with an initial speed of 16 m/s. Write a set of parametric equations for the motion of the soccer ball.

$$x = 8t\sqrt{3}, \quad y = 8t - \frac{9.8t^2}{2}$$

2) A golf ball is struck across a flat fairway at an angle of 45° with an initial speed of 136 ft/s. Write a set of parametric equations for the motion of the golf ball.

$$x = 68t\sqrt{2}, \quad y = 68t\sqrt{2} - \frac{32.17t^2}{2}$$

3) A snowball is thrown at an angle of 60° with an initial speed of 45 ft/s and an initial height of 5 ft. Write a set of parametric equations for the motion of the snowball.

$$x = \frac{45t}{2}, \quad y = 5 - \frac{32.17t^2}{2} + \frac{45t\sqrt{3}}{2}$$

4) A cannon ball is fired across a flat field at an angle of 45° with an initial speed of 103 ft/s and an initial height of 31 ft.
   i) Write a set of parametric equations for the motion of the cannon ball.
   ii) Determine how long the cannon ball was in the air.
   iii) Determine how far the cannon ball traveled in the air.
   iv) Determine when the cannon ball reached its maximum height.
   v) Determine the maximum height reached by the cannon ball.
   vi) Sketch the graph of the parametric equations.
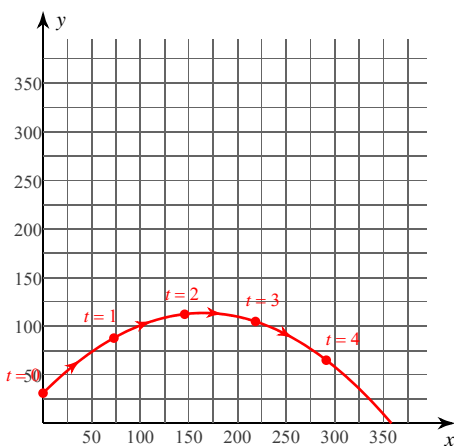
i) $x = \dfrac{103t\sqrt{2}}{2}, \quad y = 31 - \dfrac{32.17t^2}{2} + \dfrac{103t\sqrt{2}}{2}$

ii) 4.92 s

iii) 358.31 ft

iv) 2.26 s

v) 113.44 ft