

FUNCTIONS

The *Recipes* of Mathematics

Bœuf bourguignon = f (Burgundy wine, beef stock, carrots, onions, garlic, mushrooms, bacon, bouquet garni)

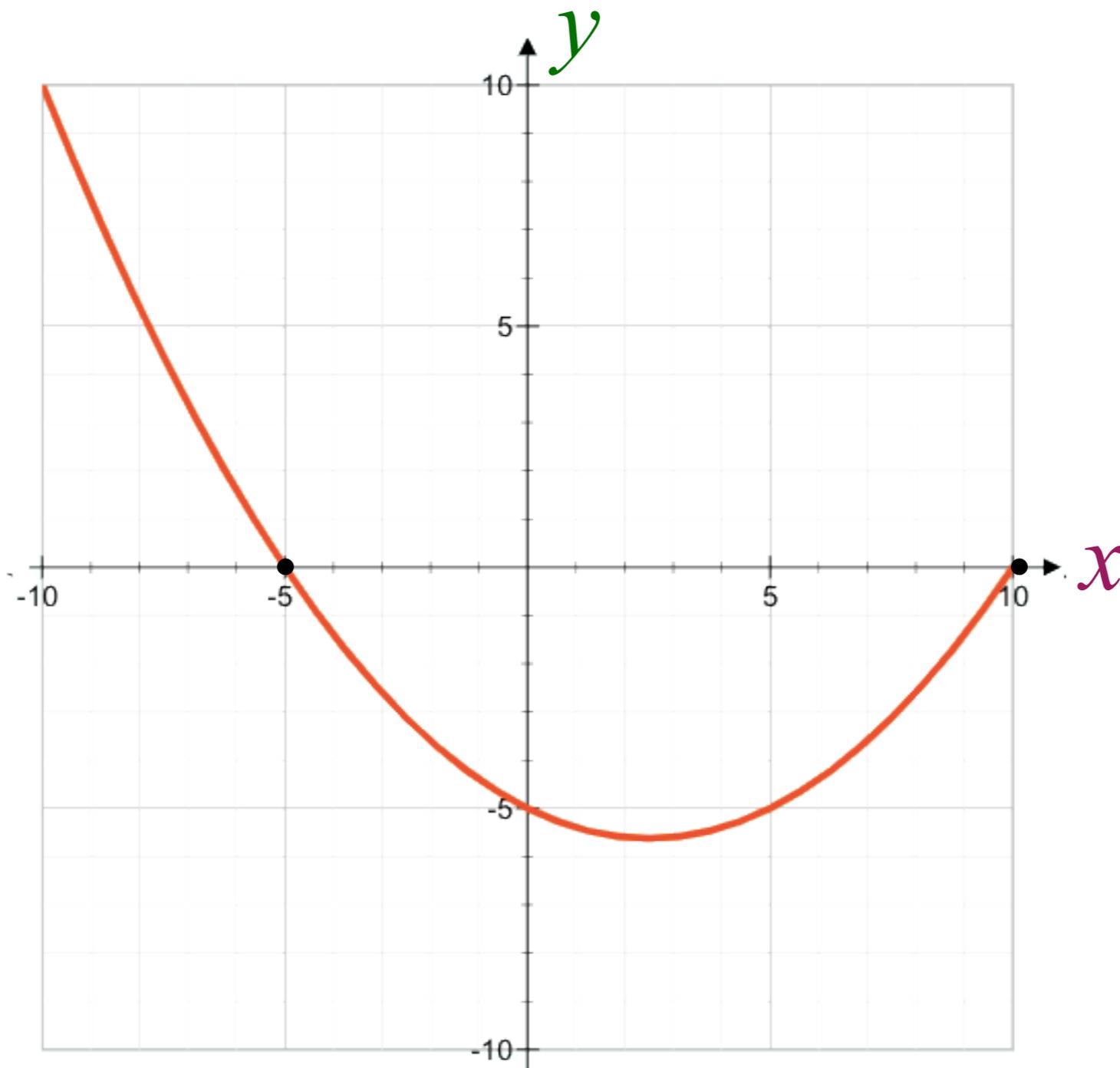
Quadratic Functions

$$y = ax^2 + bx + c$$

$$a = 0.1$$

$$b = -0.5$$

$$c = -5$$



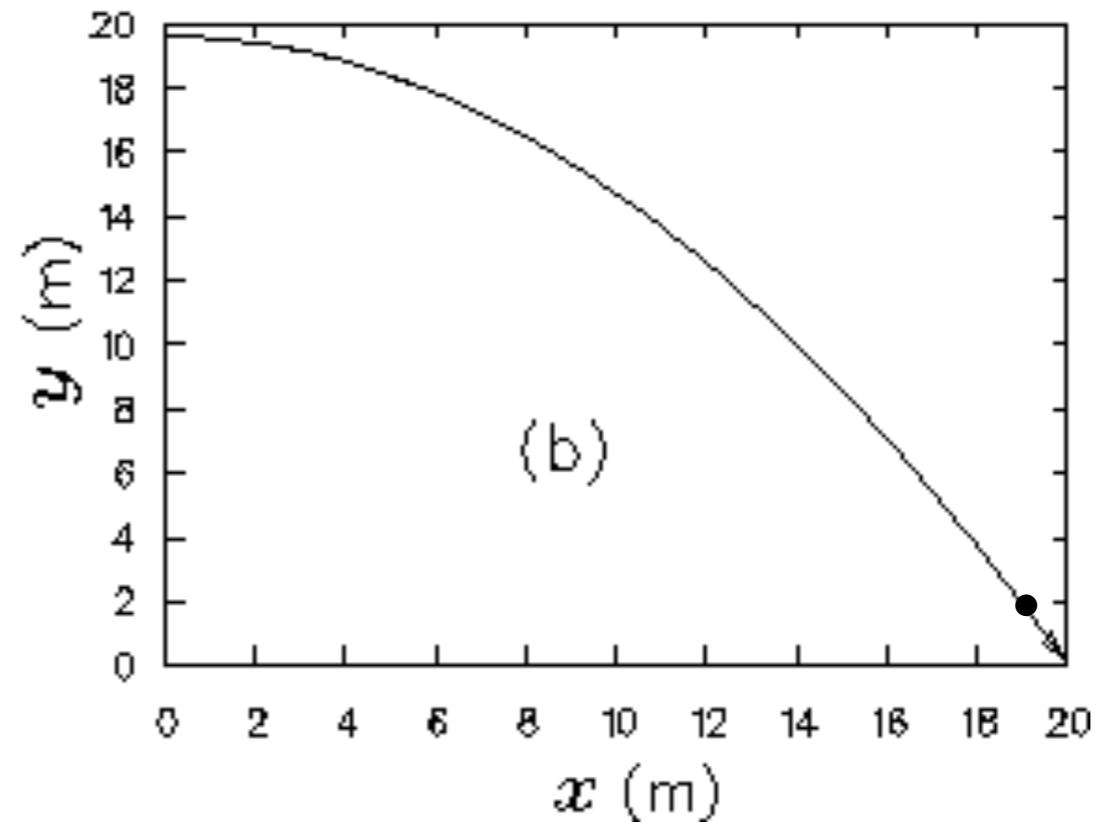
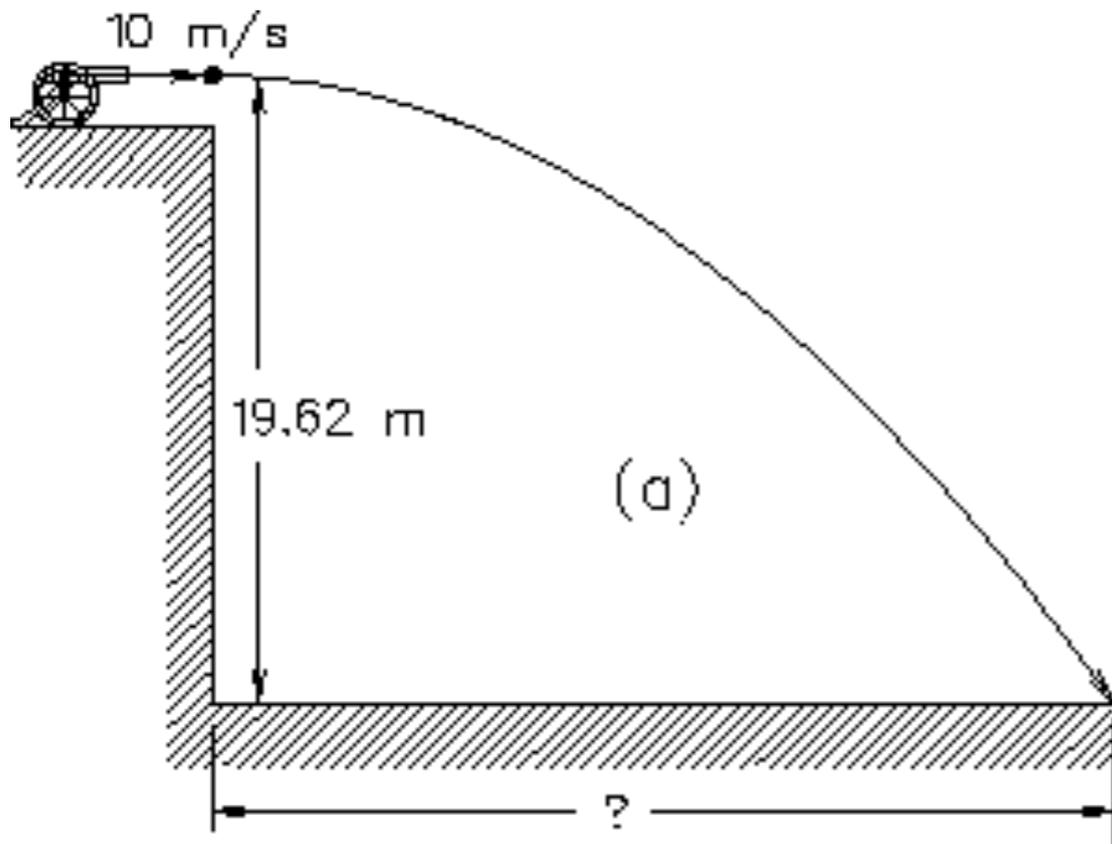
ROOTS:

$$x = -5$$

and

$$x = 10$$

Application: TRAJECTORIES



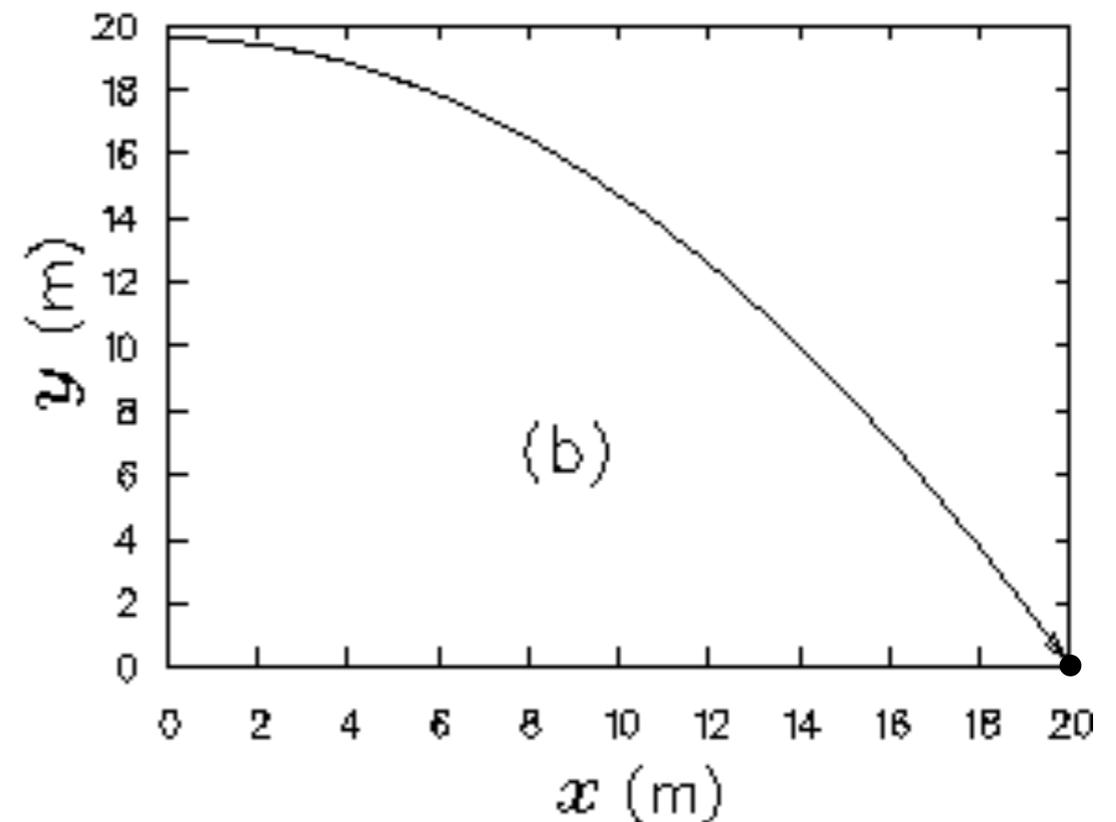
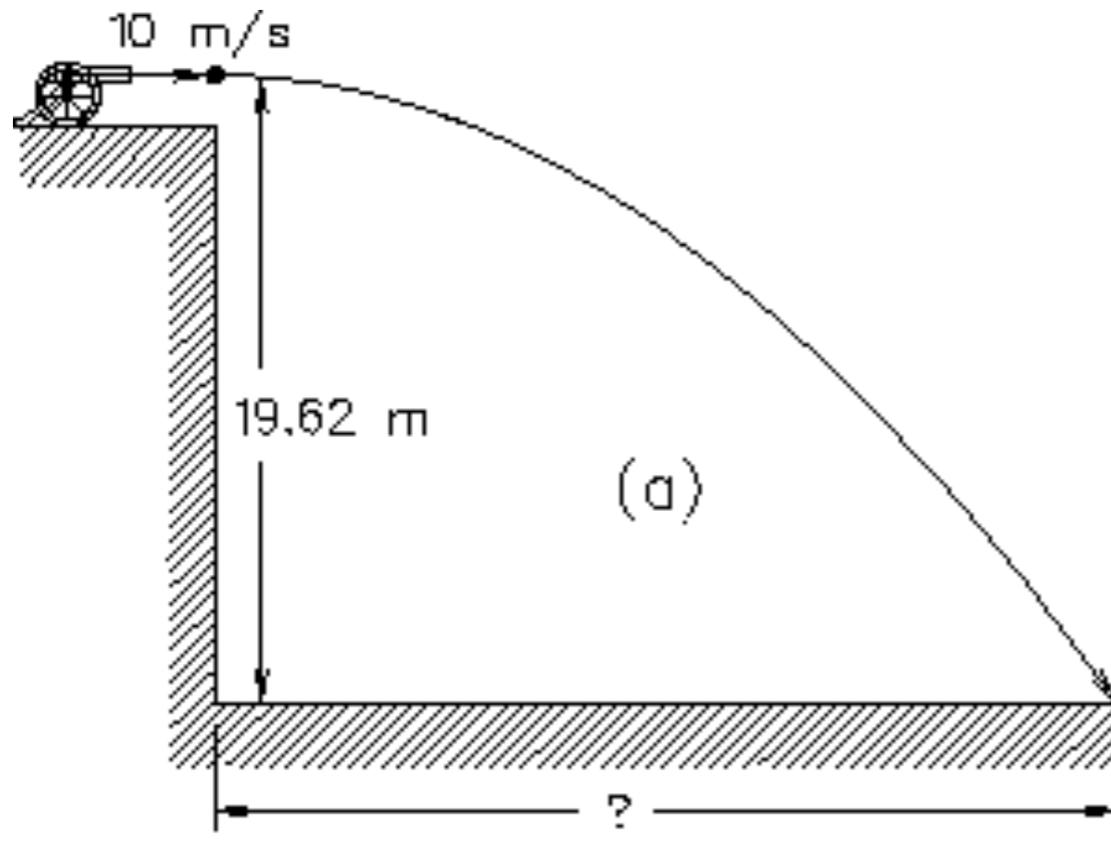
y = height (m), t = time (s), $g = 9.81 \text{ m/s}^2$ (accel. of gravity)

$$y = c - \frac{1}{2}gt^2 \quad x = 10t \quad t = 0.1x$$

$$y = ax^2 + bx + c \quad \text{with} \quad a = -0.04905, \quad b = 0, \quad c = 19.62$$

TRAJECTORIES, cont'd

$$y = ax^2 + bx + c \quad \text{with} \quad a = -0.04905, \quad b = 0, \quad c = 19.62$$



$$y = 0 \quad \text{when} \quad x = \left(-b \pm \sqrt{b^2 - 4ac} \right) \div 2a$$

$$= \frac{\sqrt{4 \times 0.04905 \times 19.62}}{2 \times 0.04905} = 20$$