FUNCTIONS

The *Recipes* of Mathematics

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

Quadratic Functions

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

Quadratic Functions

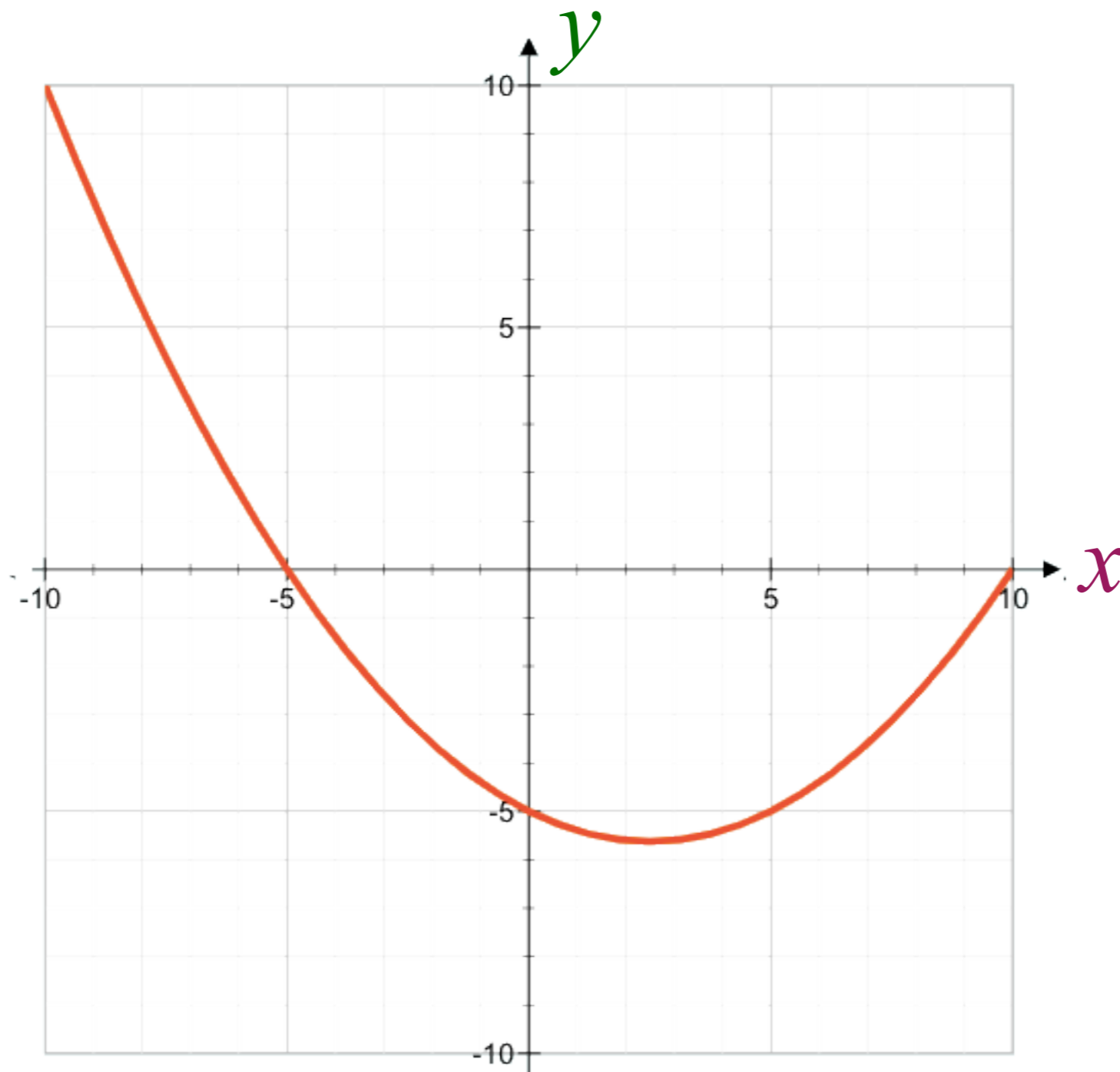$$y = ax^2 + bx + c$$

$a = 0.1$

$b = -0.5$

$c = -5$

Quadratic Functions

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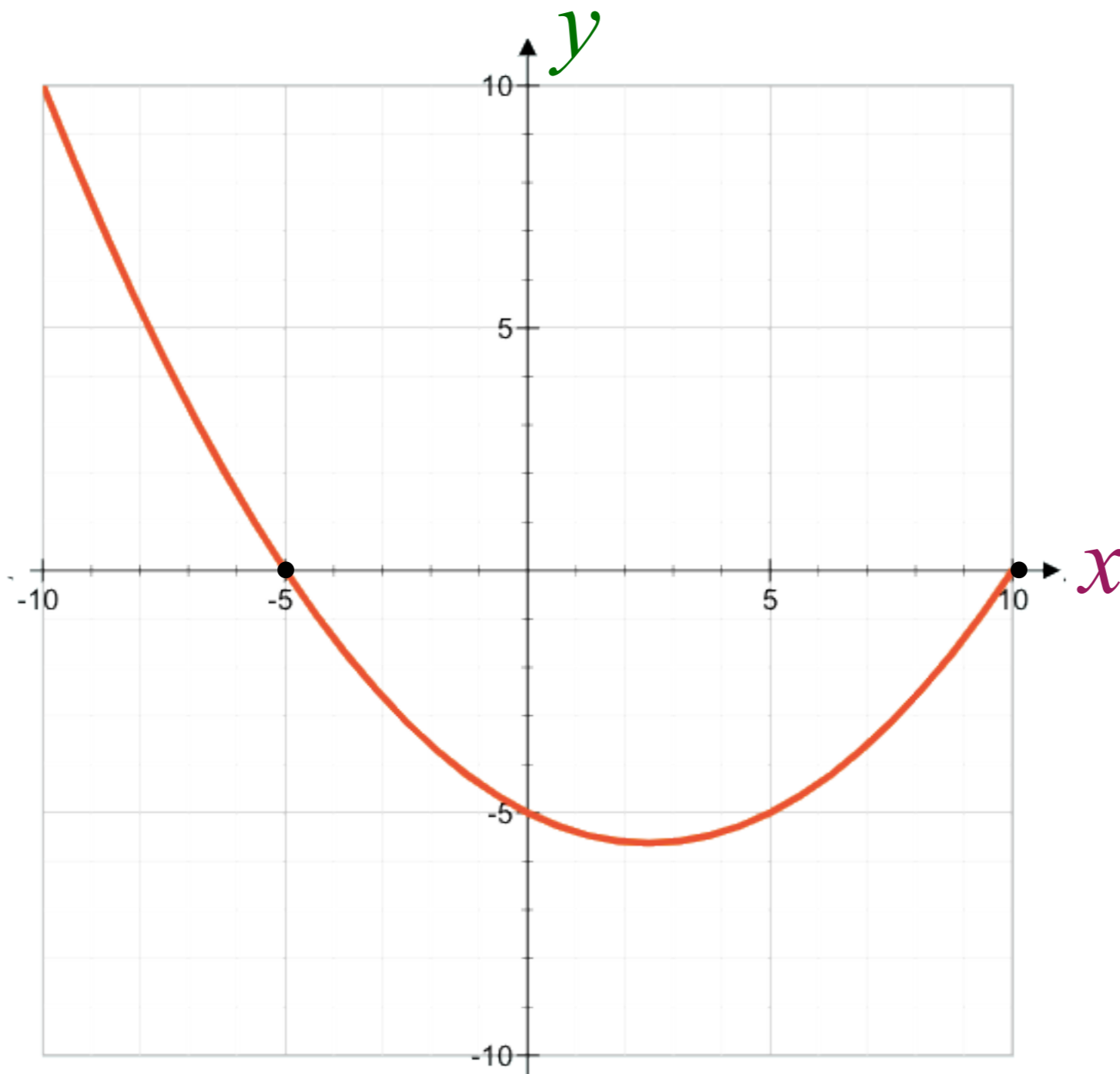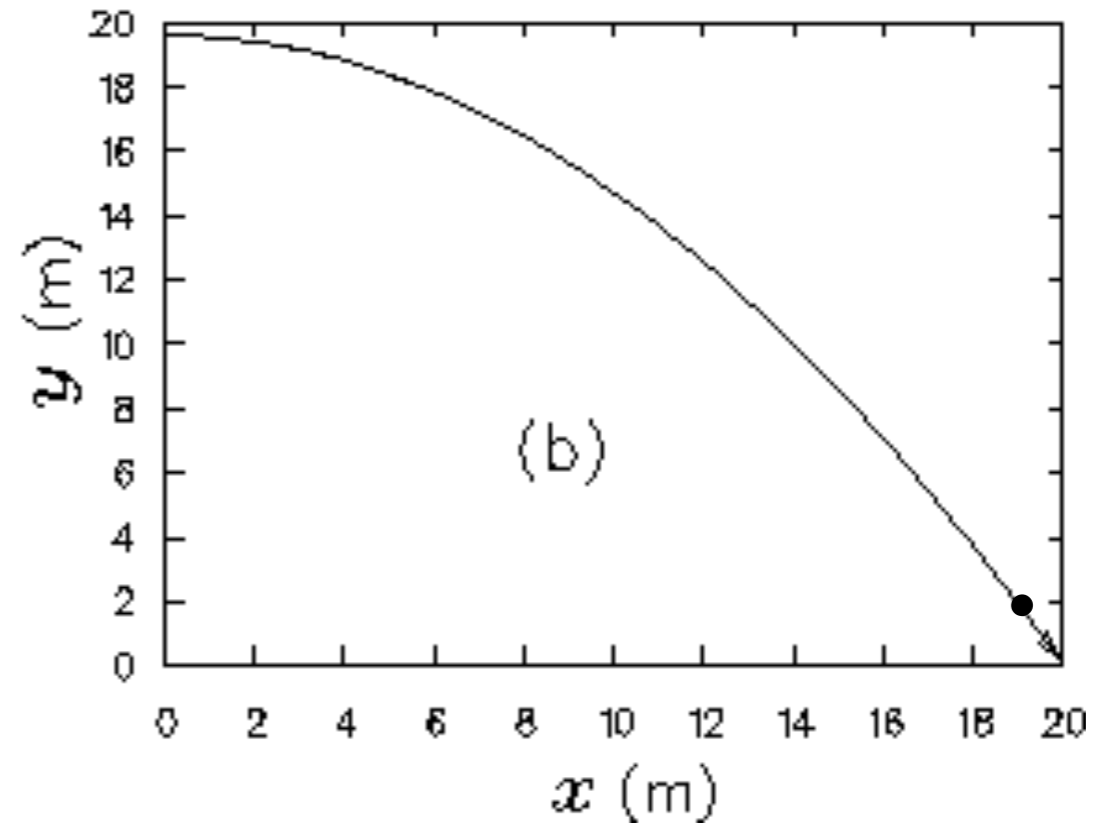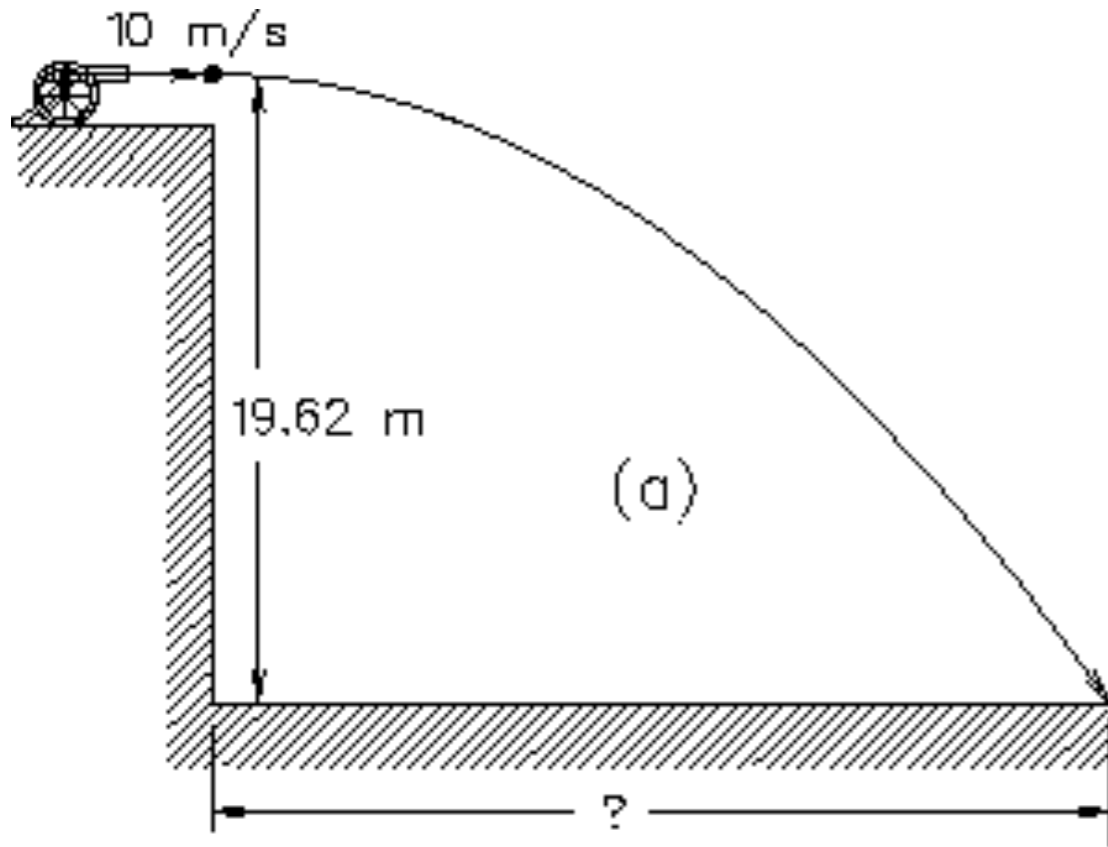
Quadratic Functions

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

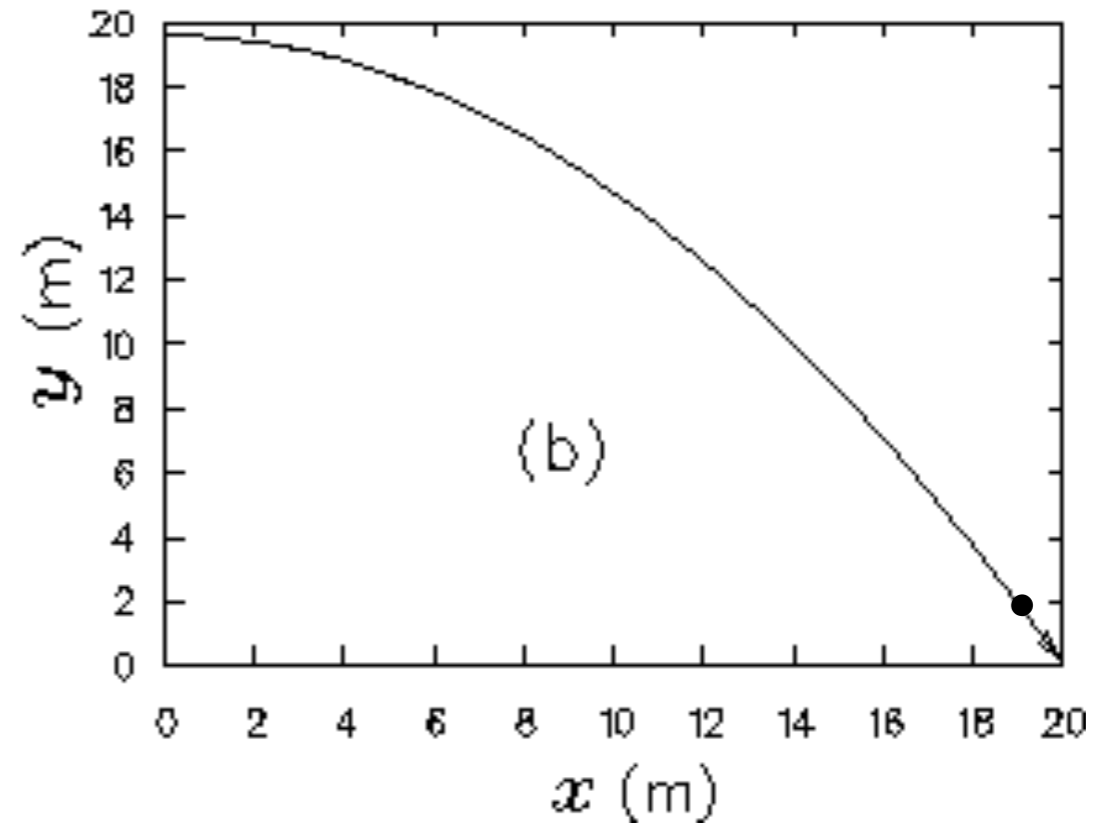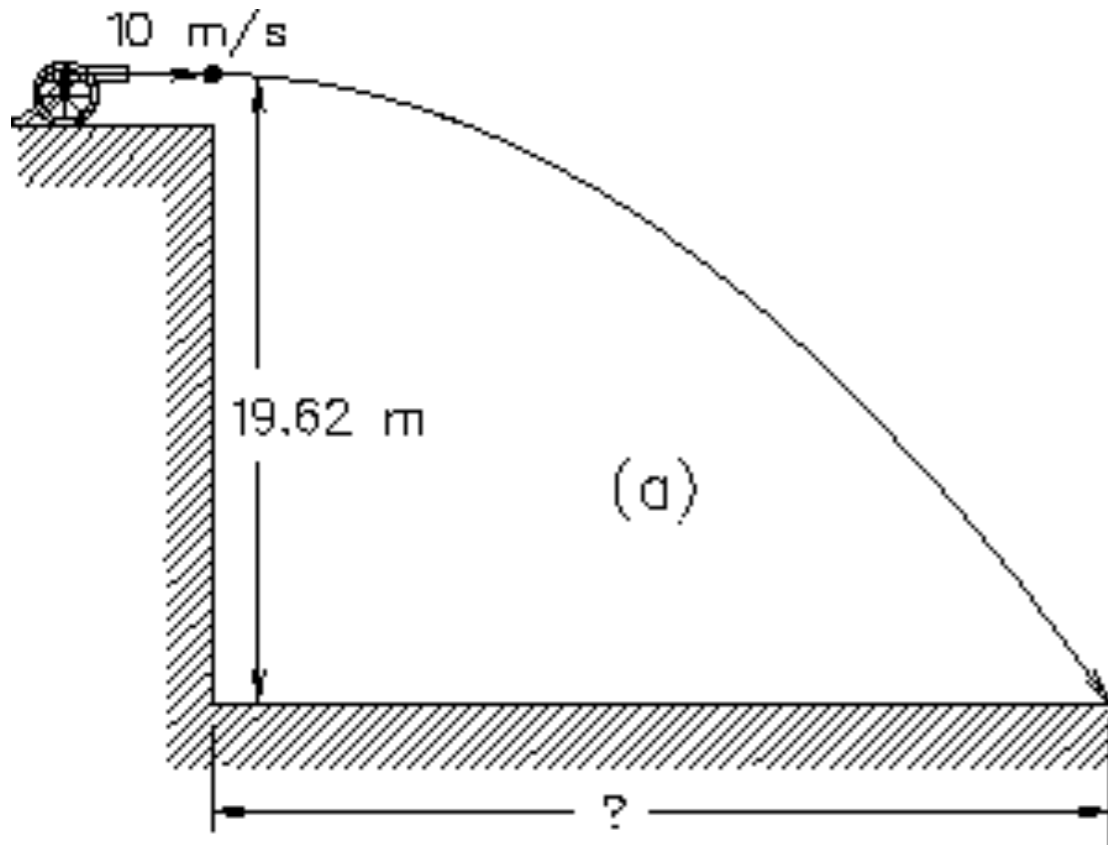$a = 0.1$

$b = -0.5$

$c = -5$

ROOTS:

$x = -5$

and

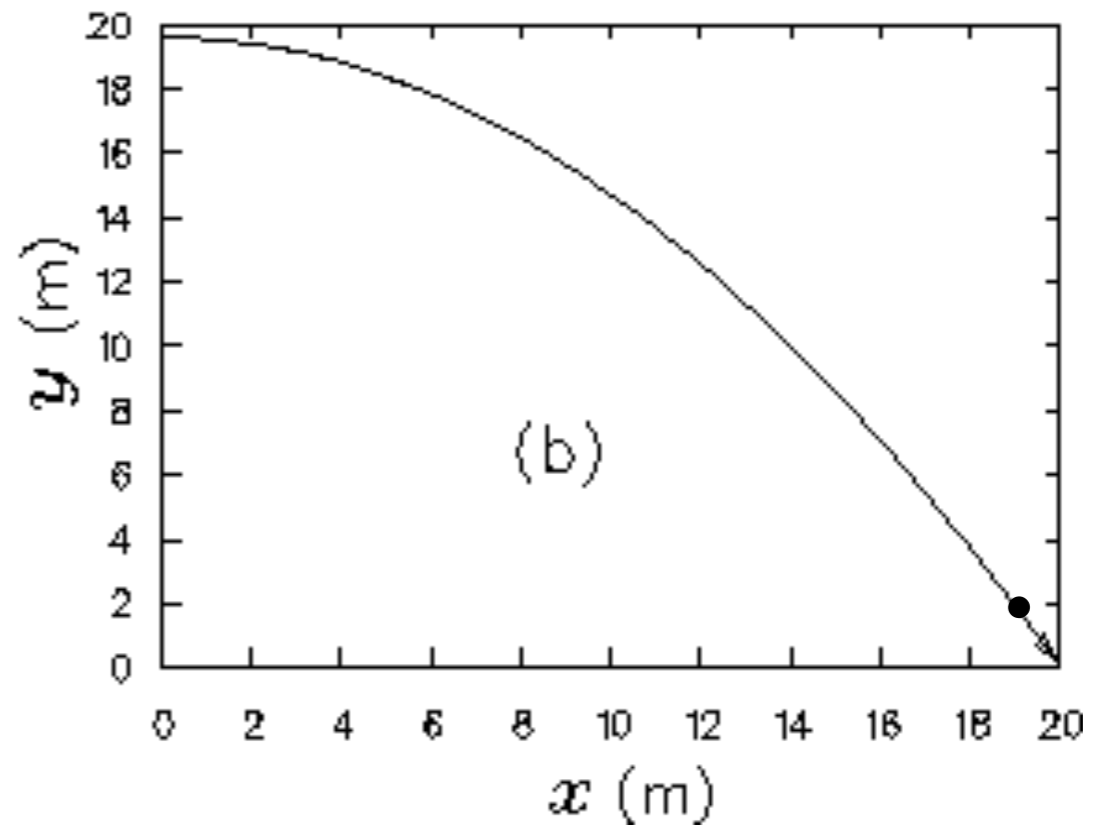$x = 10$

Application: TRAJECTORIES

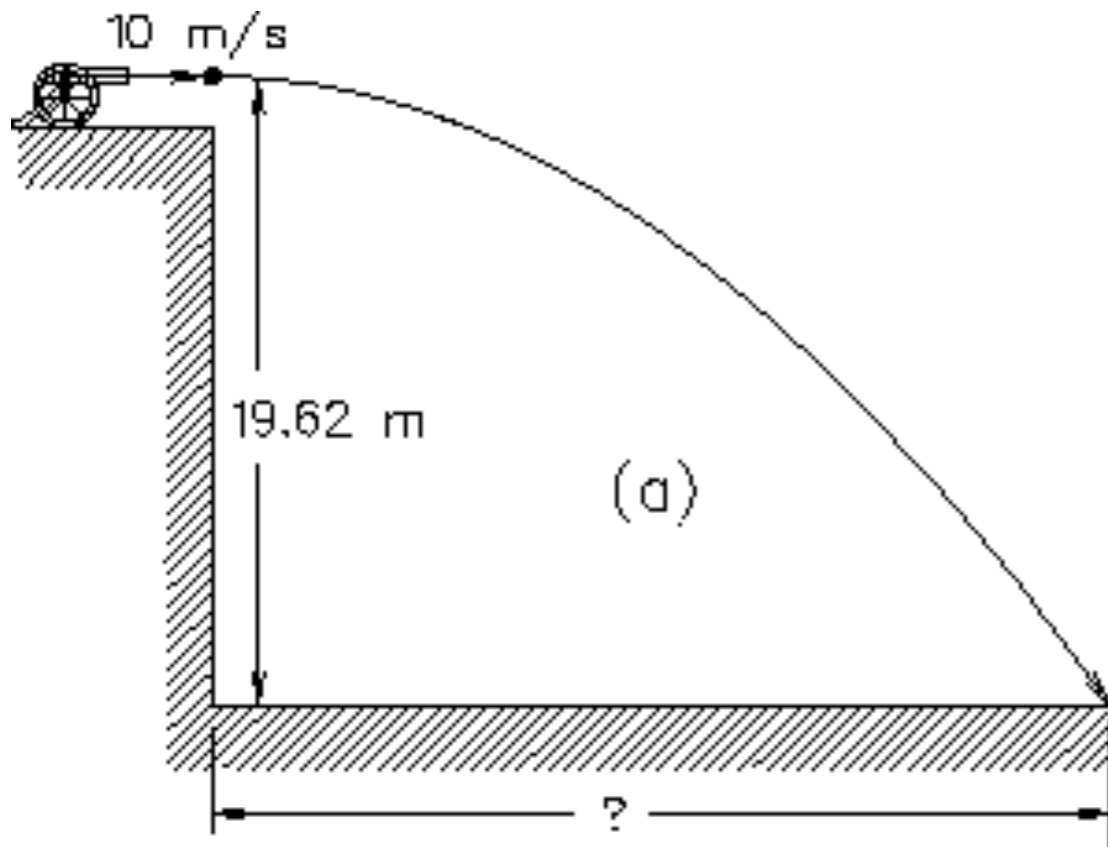# Application: TRAJECTORIES

(a)

(b)

y = height (m), t = time (s), $g = 9.81$ m/s^2 (accel. of gravity)
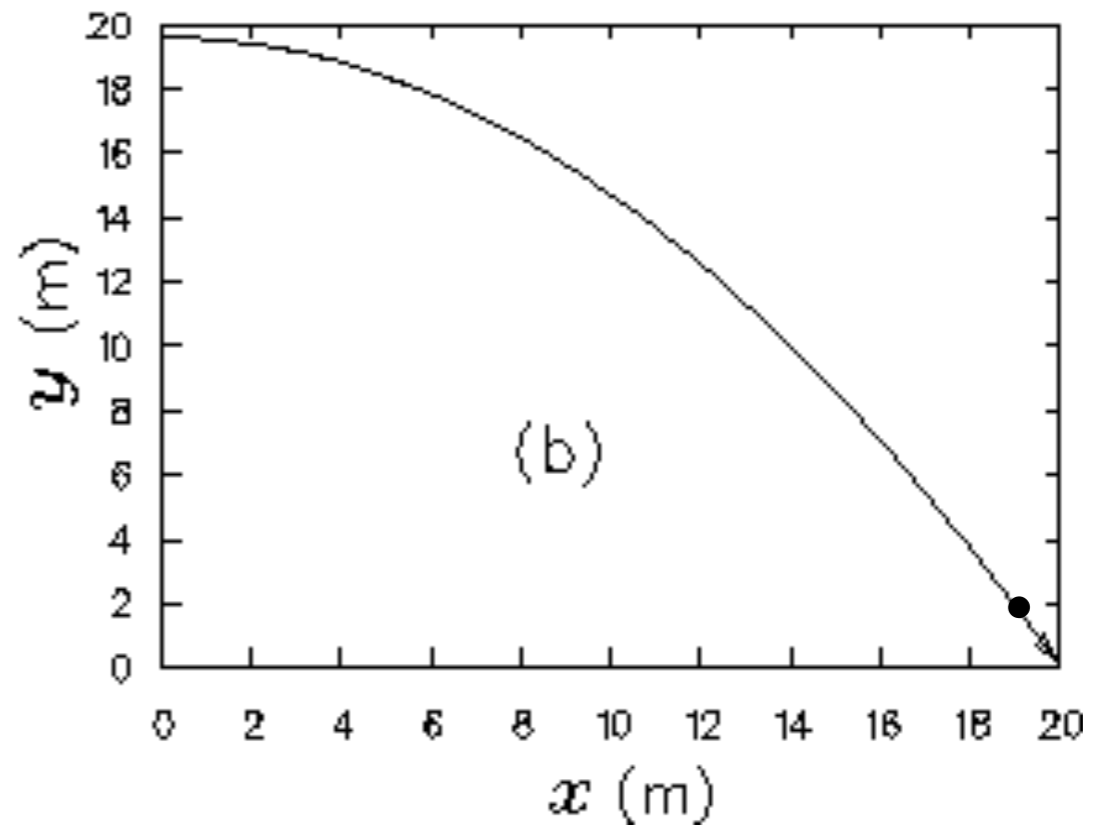
Application: TRAJECTORIES
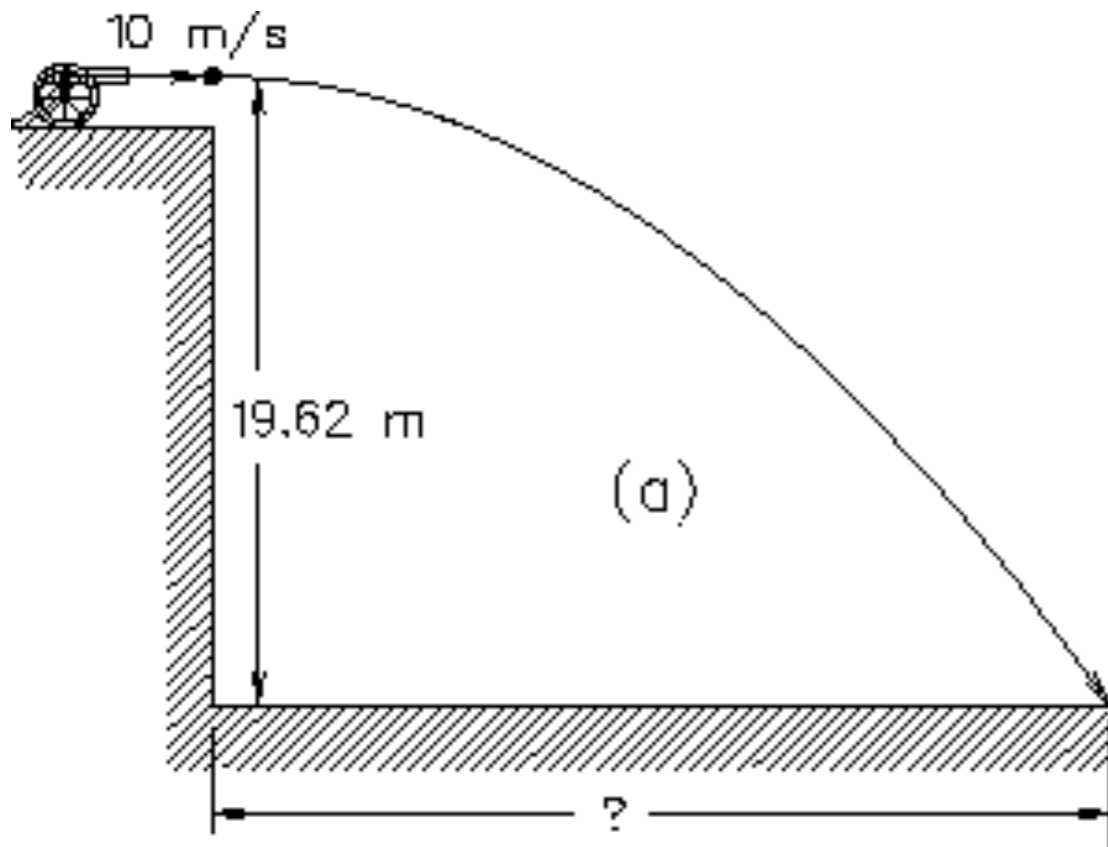

(a)

(b)

10 m/s

19.62 m

?

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

$$y = c - \tfrac{1}{2} g t^2$$

$$x = 10\, t \qquad t = 0.1 x$$
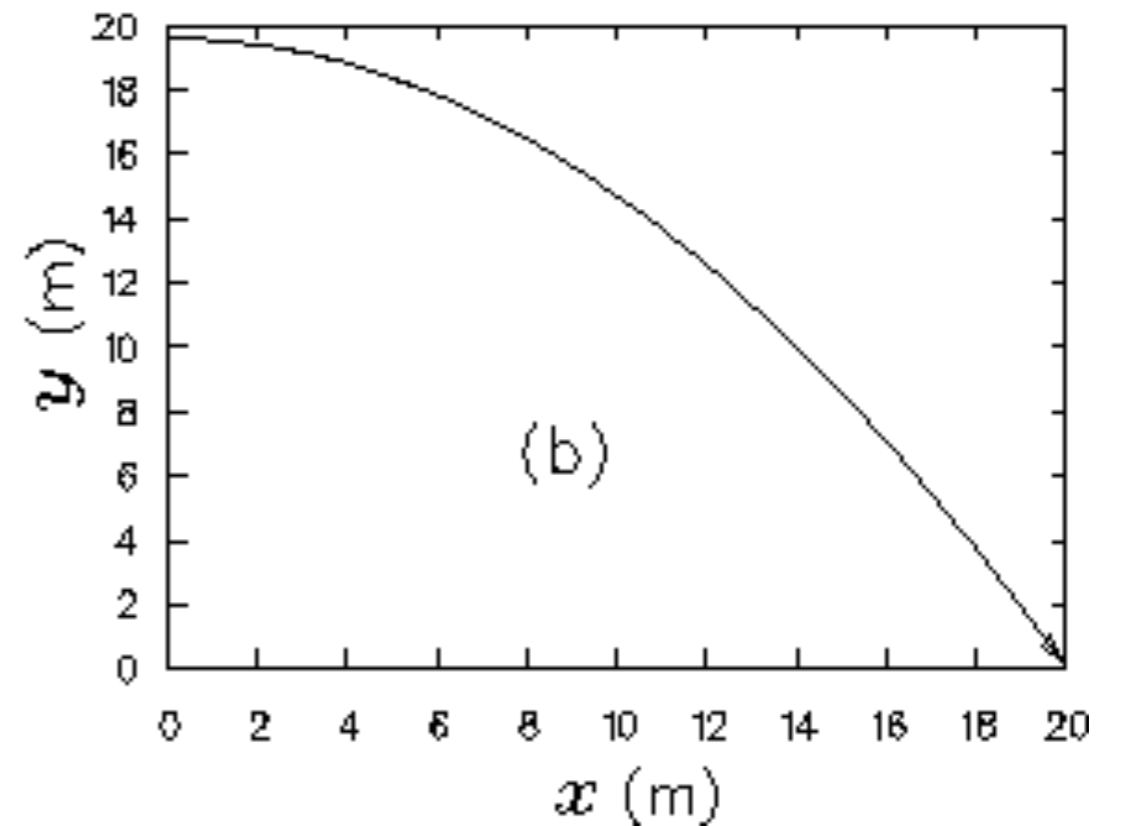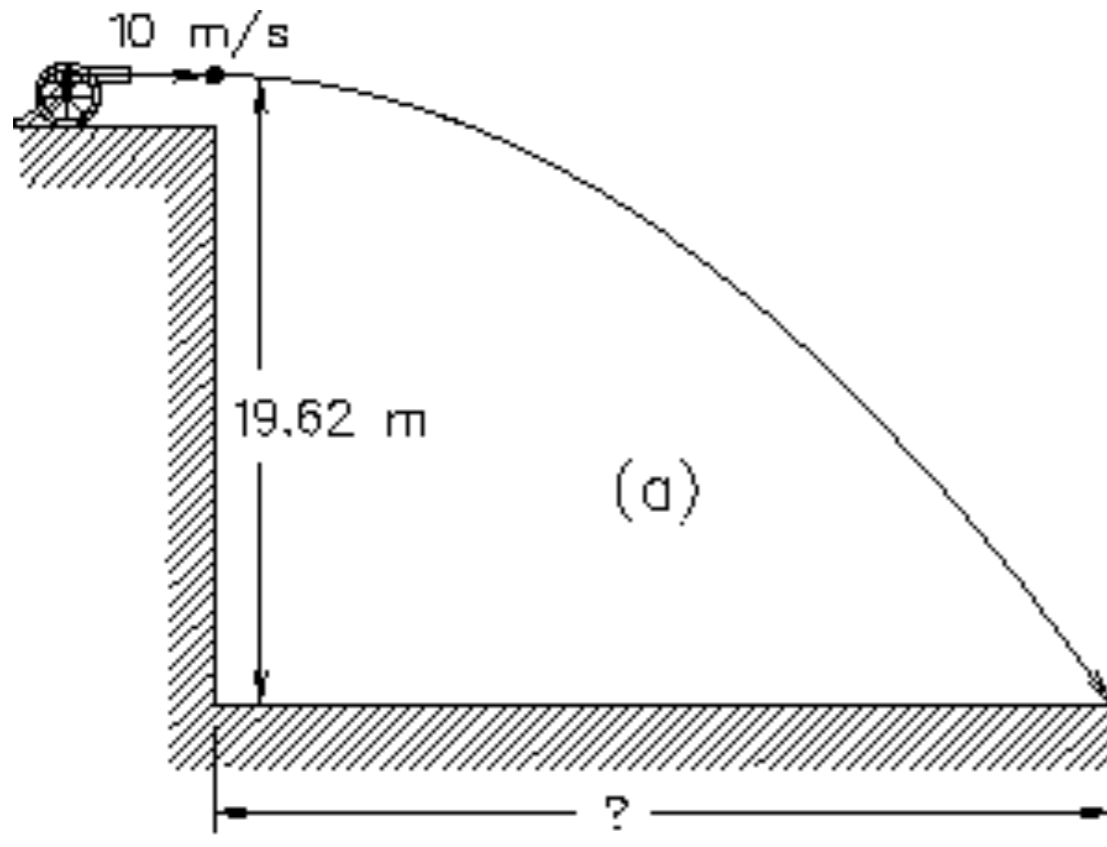
Application: TRAJECTORIES

(a)

(b)

y = height (m), t = time (s), g = 9.81 m/s^2 (accel. of gravity)

$$y = c - \tfrac{1}{2}g\,t^2 \qquad\qquad x = 10\,t \qquad t = 0.1x$$

$$y = a\,x^2 + b\,x + c \quad \text{with} \quad a = -0.04905, \quad b = 0, \quad c = 19.62$$
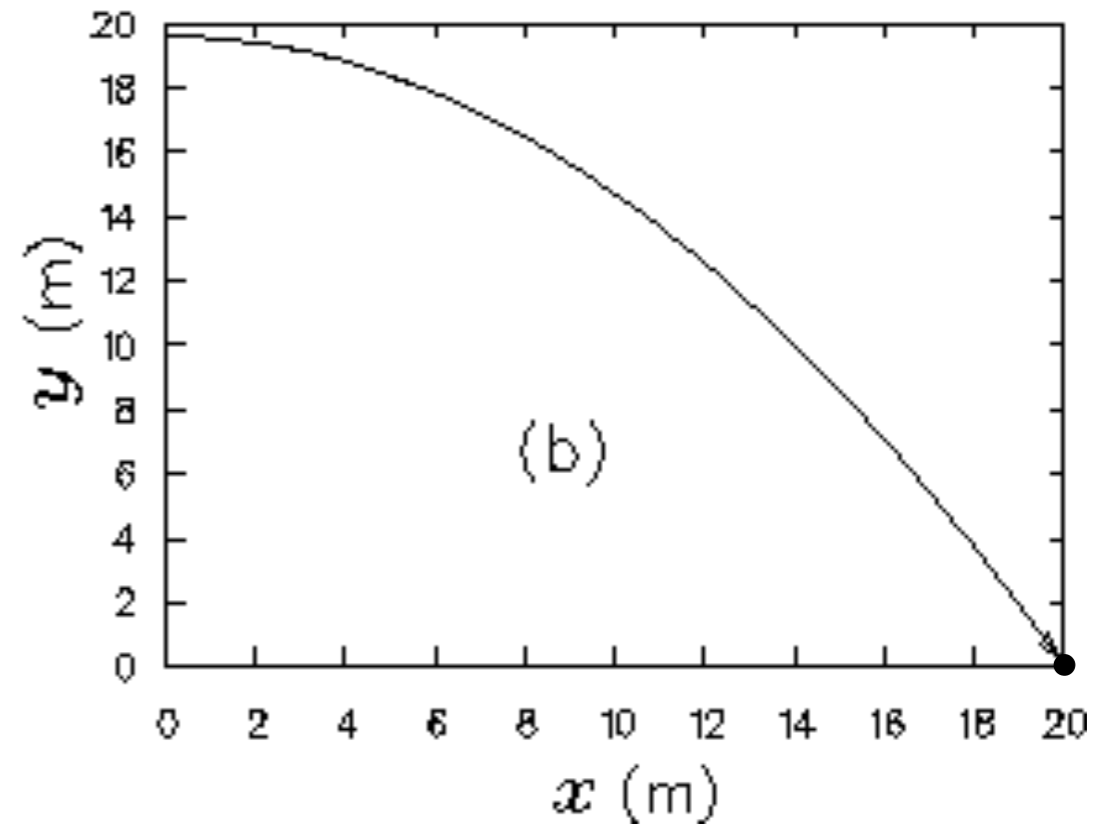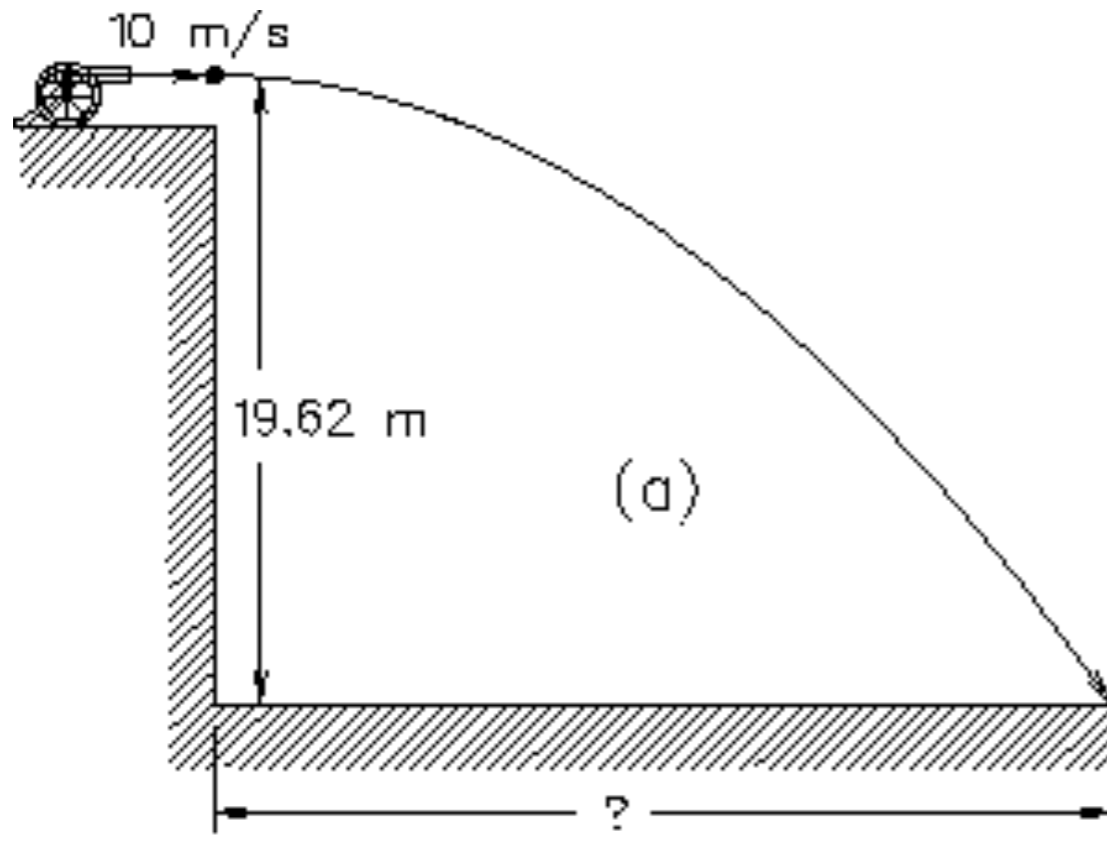
TRAJECTORIES, cont'd

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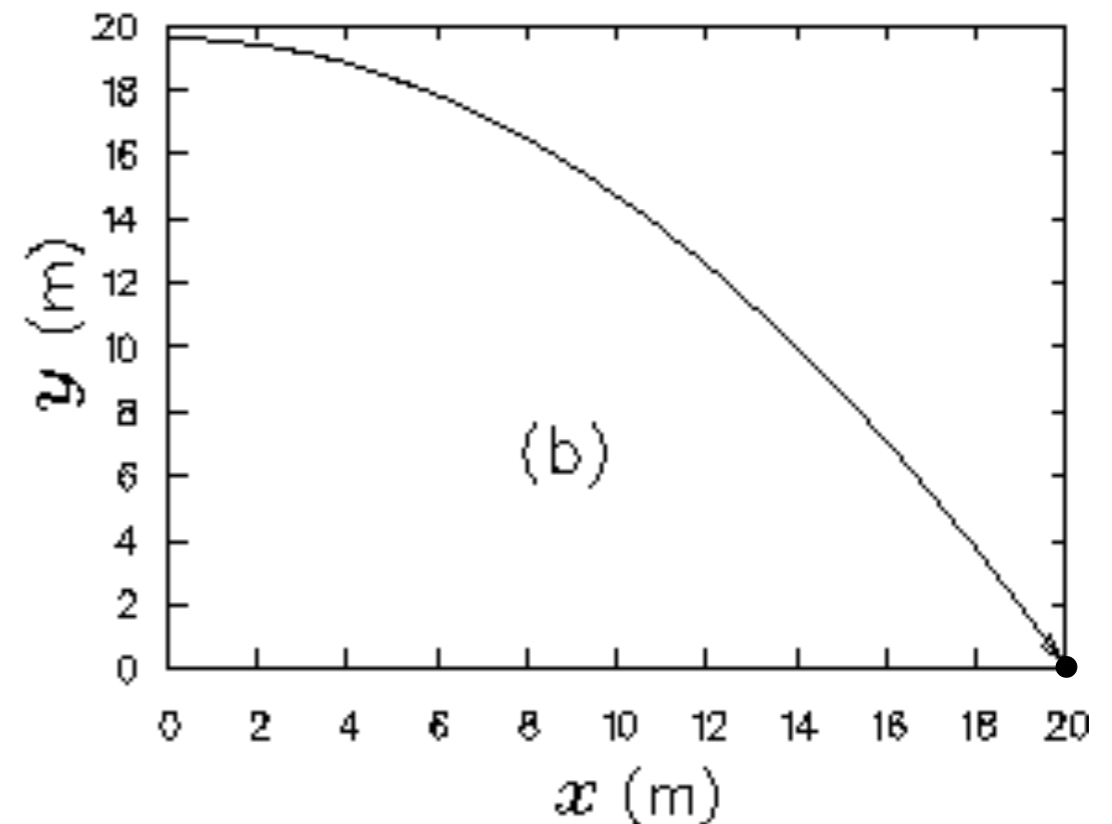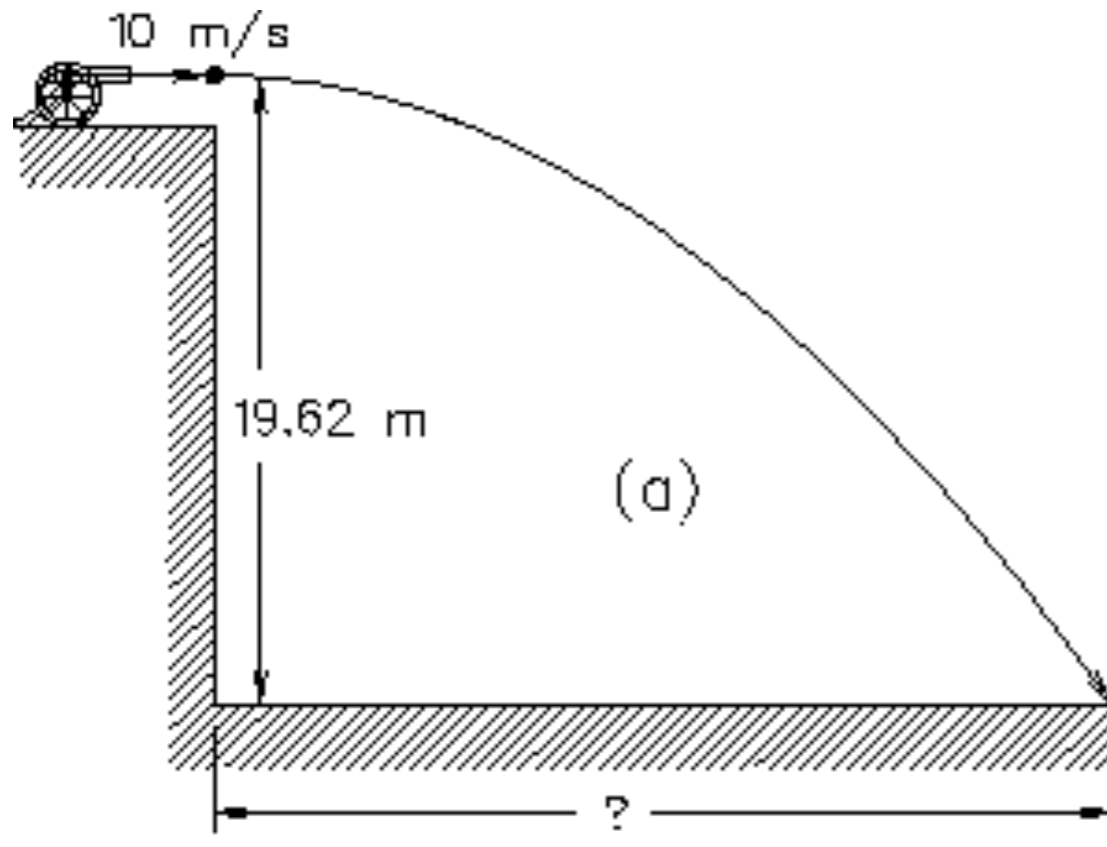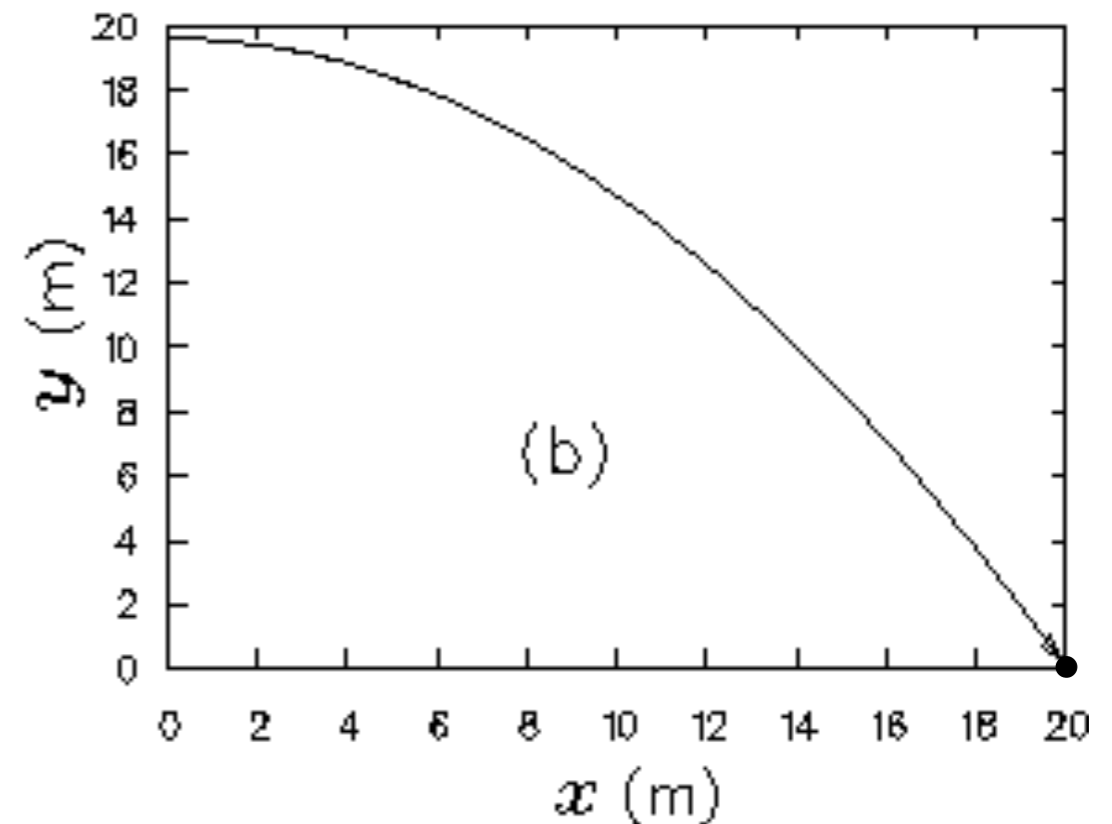
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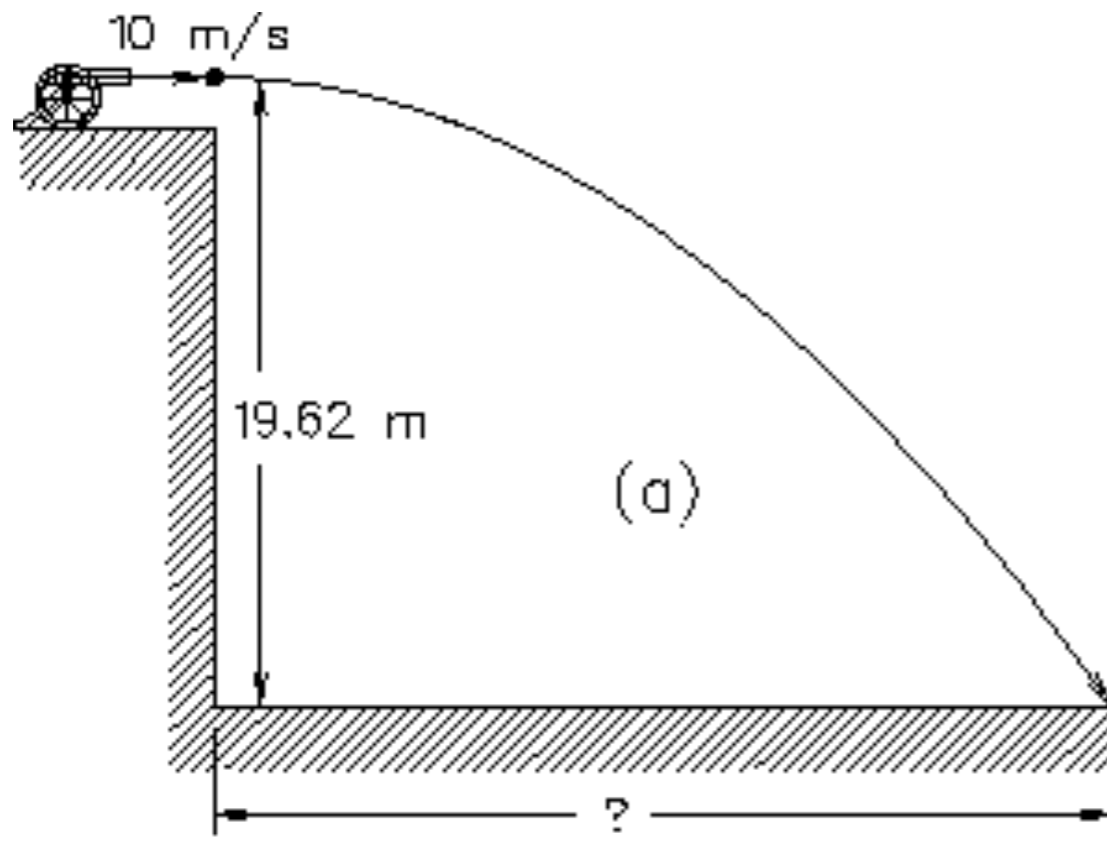

(a)

(b)

TRAJECTORIES, cont'd

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

(a)

(b)

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

TRAJECTORIES, cont'd

$y = a x^2 + b x + c$ with $a = -0.04905,$ $b = 0,$ $c = 19.62$

(a)

10 m/s

19.62 m

?

(b)

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

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