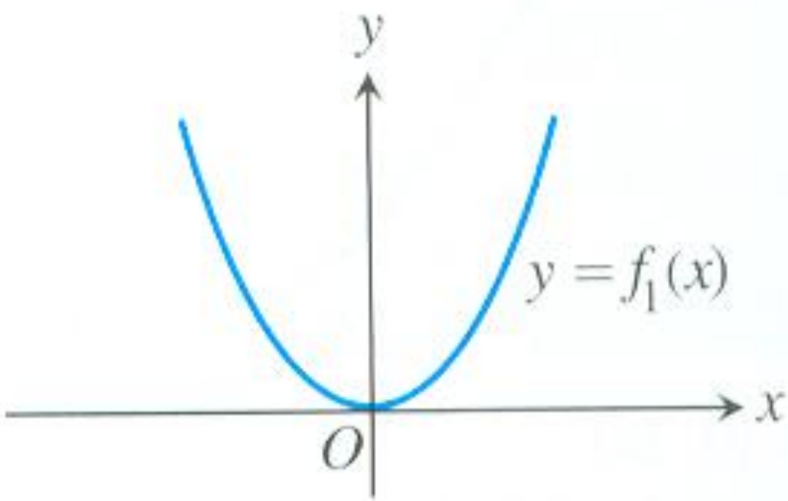
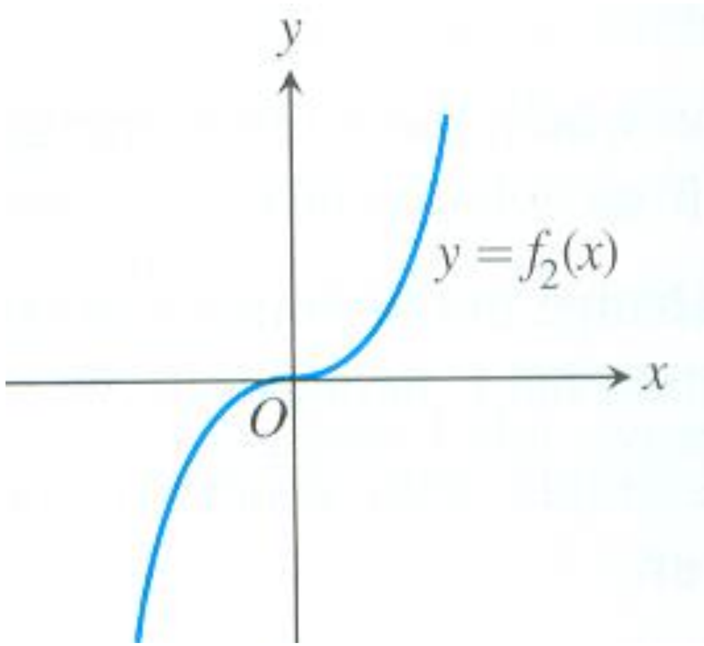
p. 105 13-16

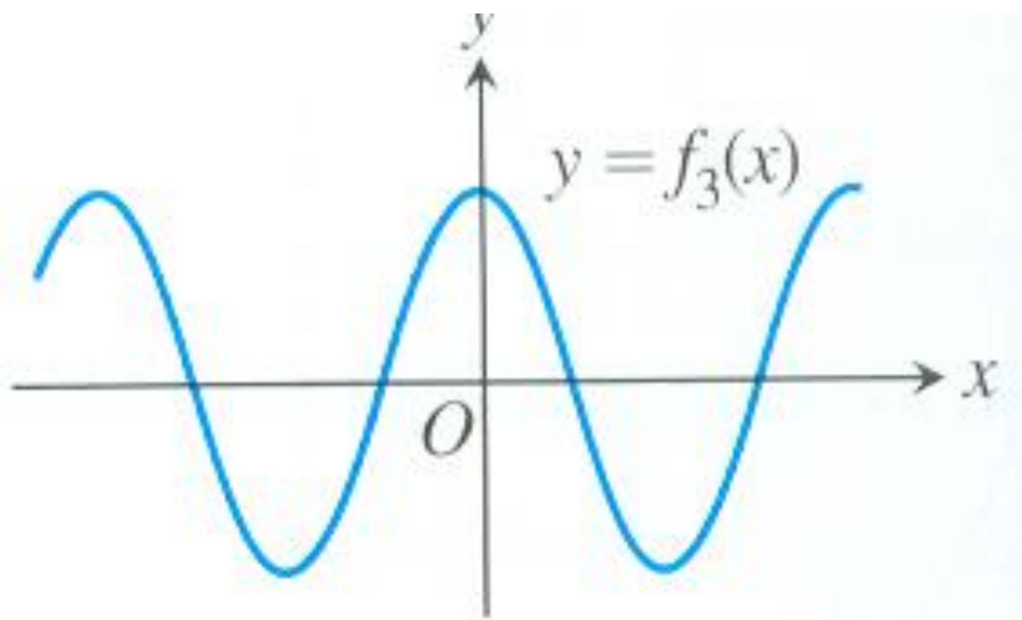
Sketch the graph of the derivative given the original function



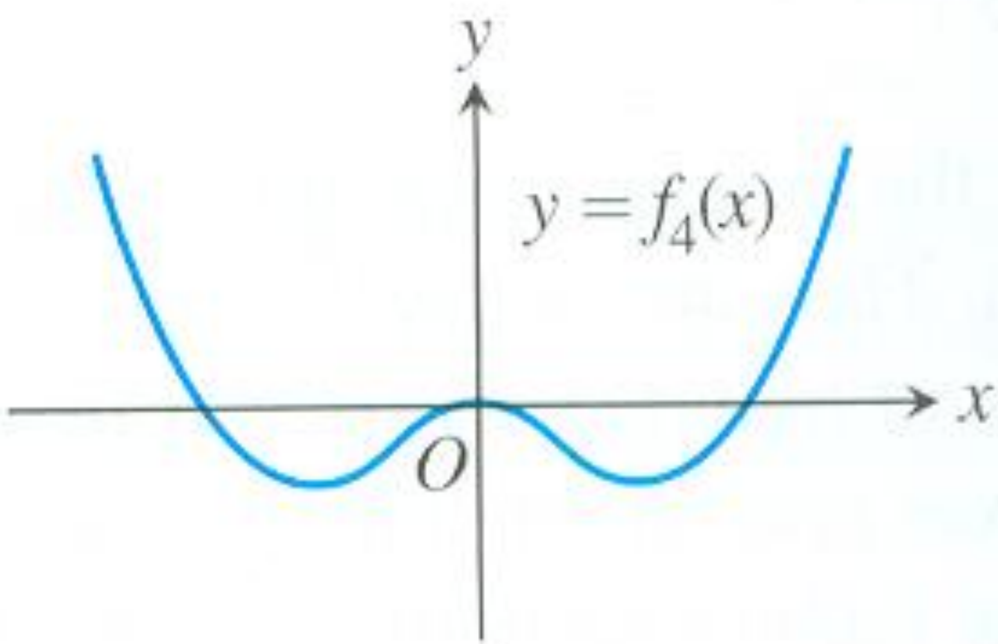
Sketch the graph of the derivative given the original function



Sketch the graph of the derivative given the original function



Sketch the graph of the derivative given the original function



p. 106 27

- Sketch the graph of a continuous function f with f(0) = -1 and

$$f'(x) = \begin{cases} 1, & x < -1 \\ -2, & x > -1 \end{cases}$$

p. 106 28

- Sketch the graph of a continuous function f with f(0) = 1 and

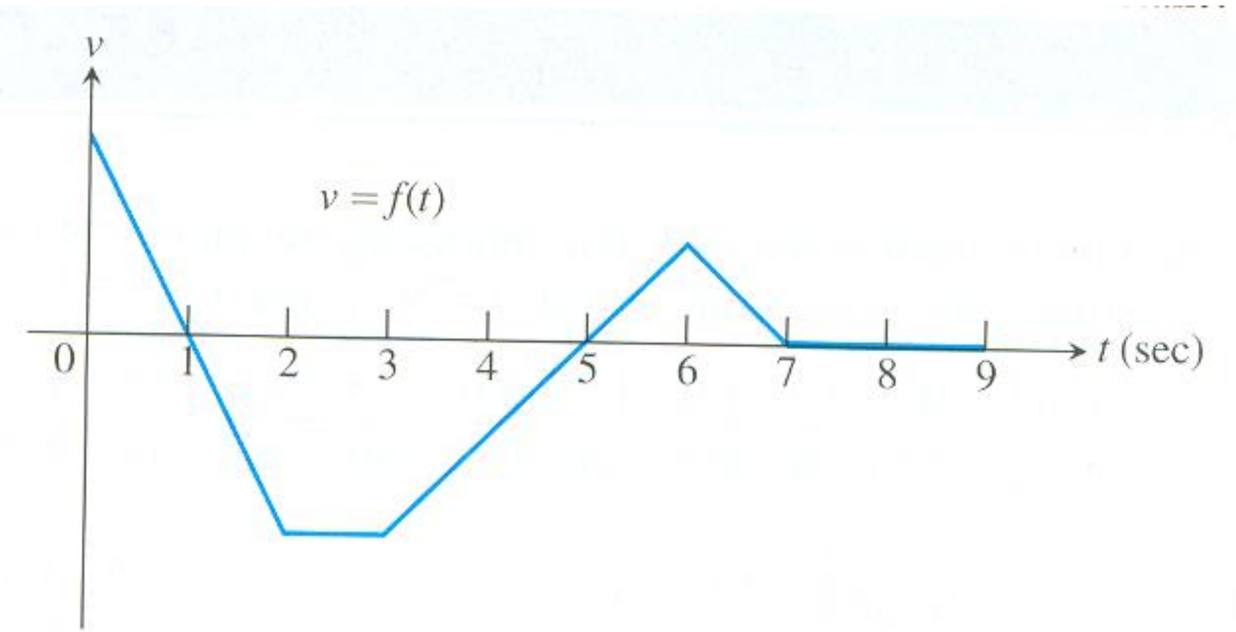
$$f'(x) = \begin{cases} 2, & x < 2 \\ -1, & x > 2 \end{cases}$$

The number of gallons of water in a tank t minutes after the tank has started to drain is $z(t) = 200(30 - t)^2$. How fast is the water running out at the end of 10 minutes?

p. 136 8

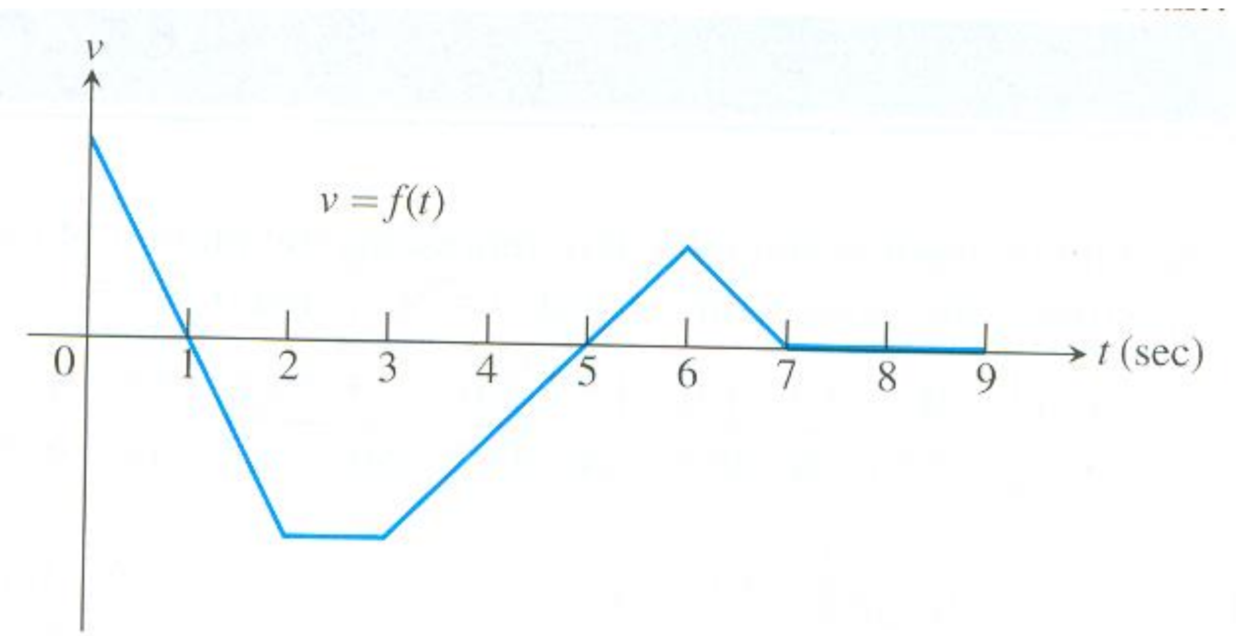
The number of gallons of water in a tank t minutes after the tank has started to drain is $z(t) = 200(30 - t)^2$. What is the average rate at which the water flows out during the first 10 minutes?

p. 136 #9



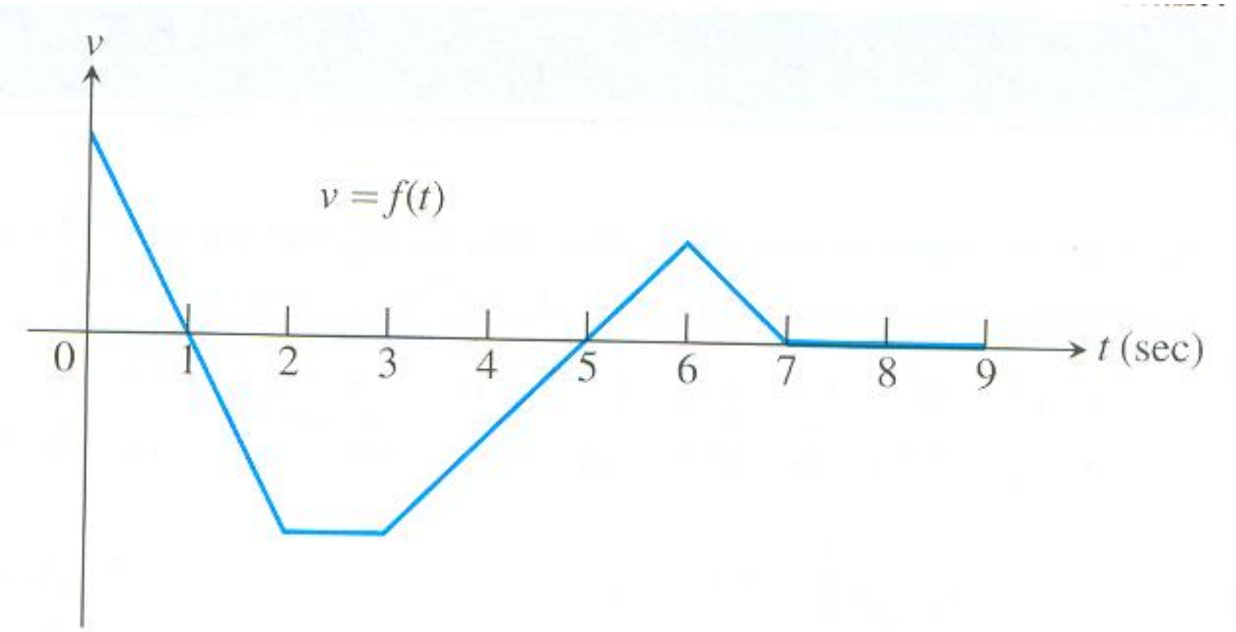
a. When does the particle move forward? Move backward?

p. 136 #9



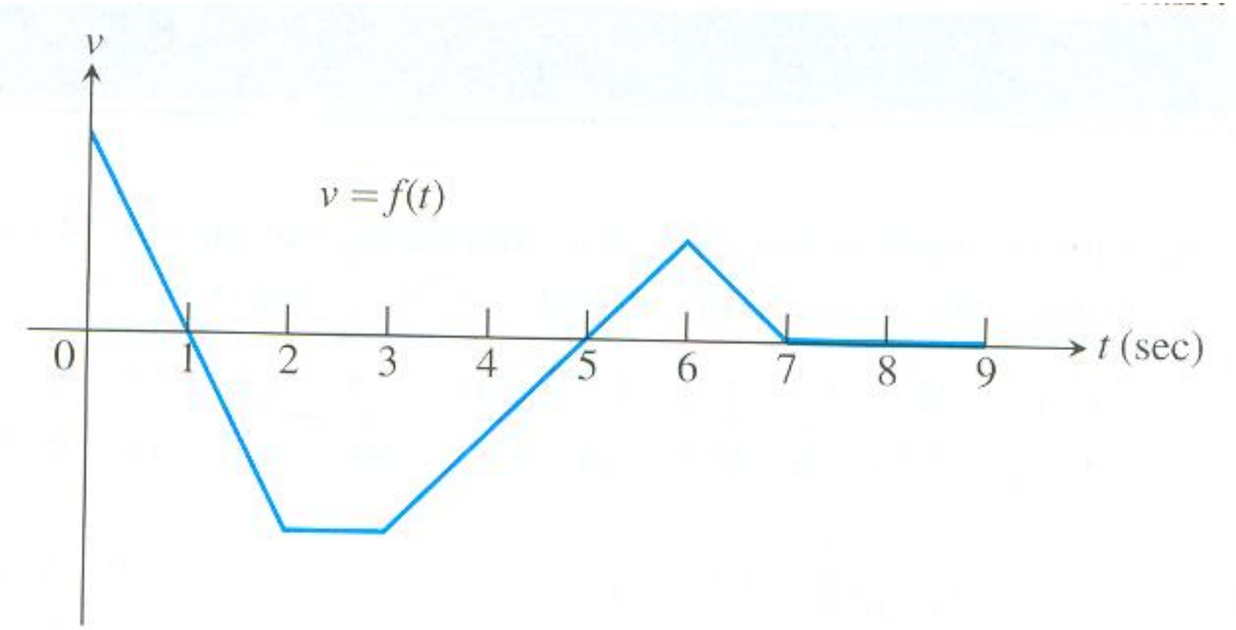
a. When does the particle speed up? Slow down?

p. 136 #9



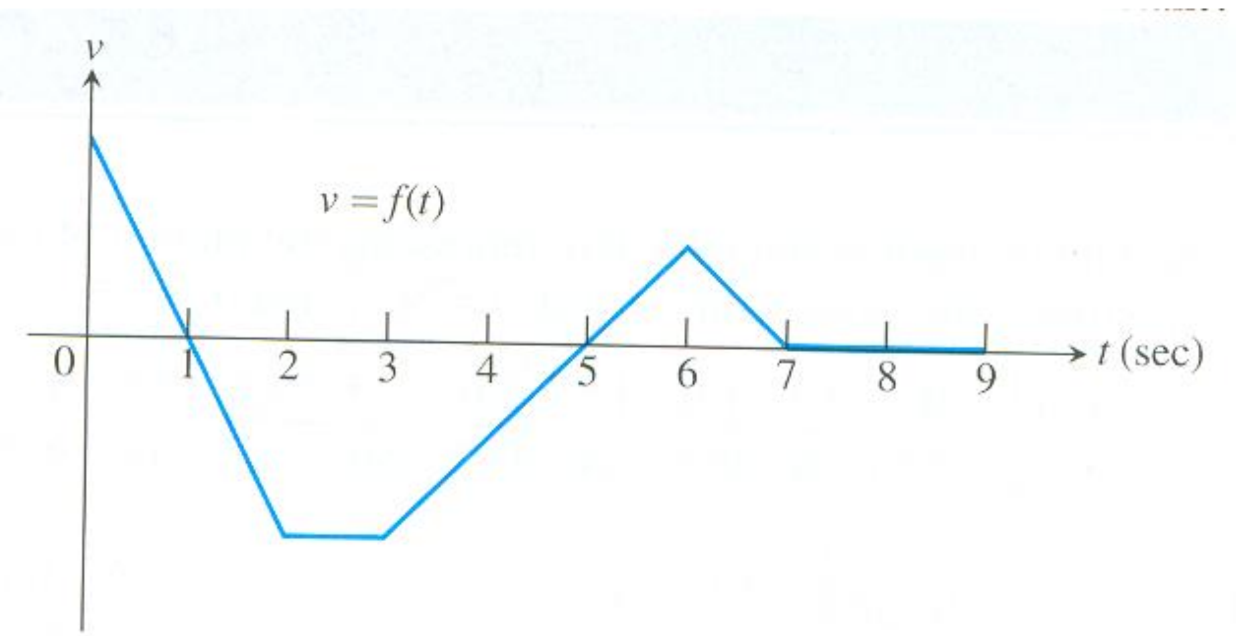
b. When is the particle's acceleration positive? Negative? Zero?

p. 136 #9



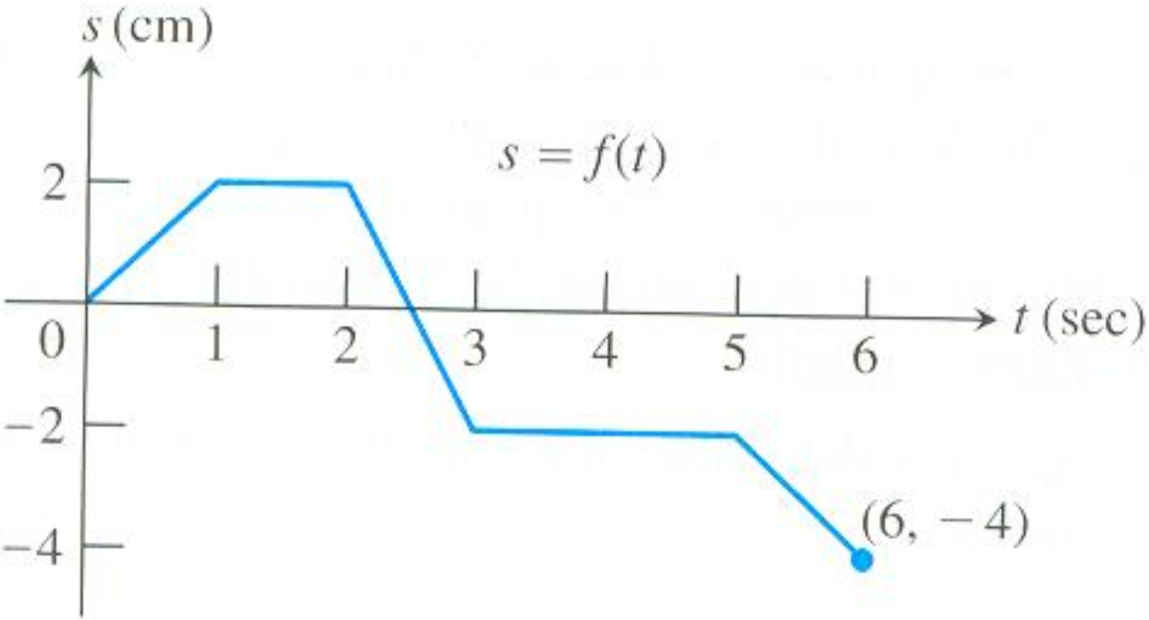
c. When does the particle move at its greatest speed?

p. 136 #9



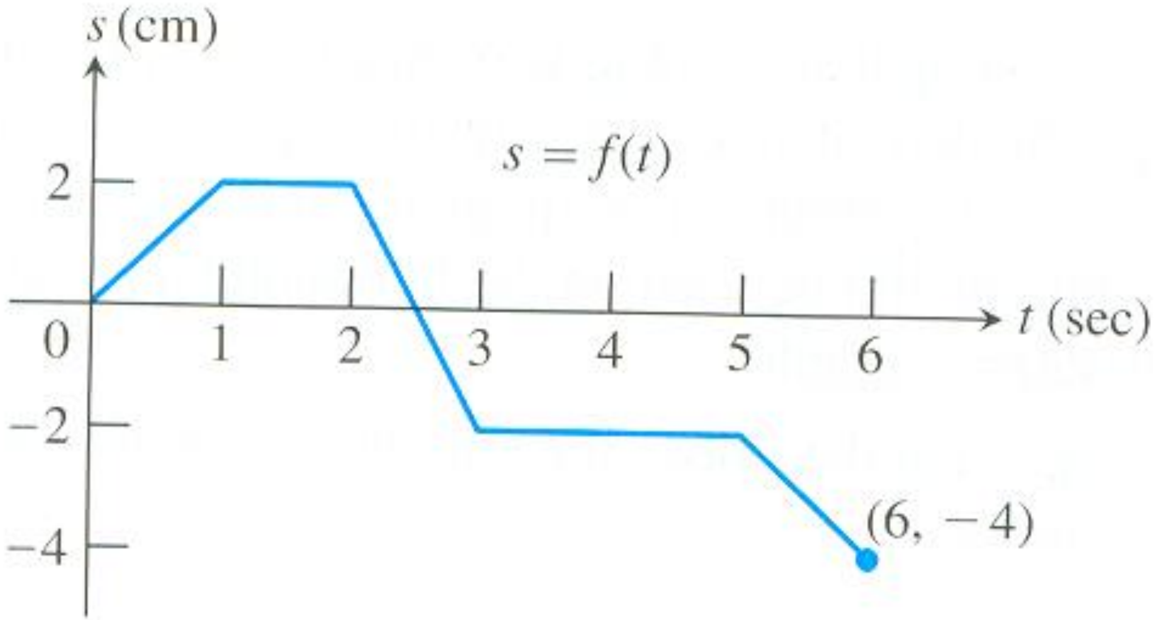
d. When is the particle at rest?

p. 136 #10



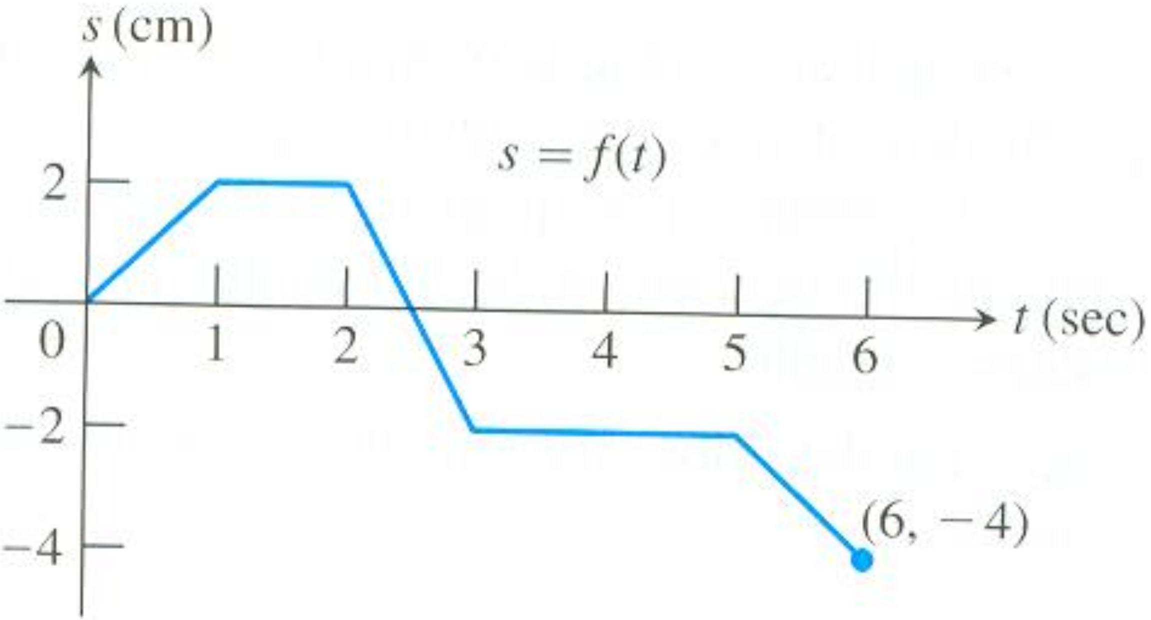
a. When is the particle moving to the left? Moving to the right? Standing Still

p. 136 #10



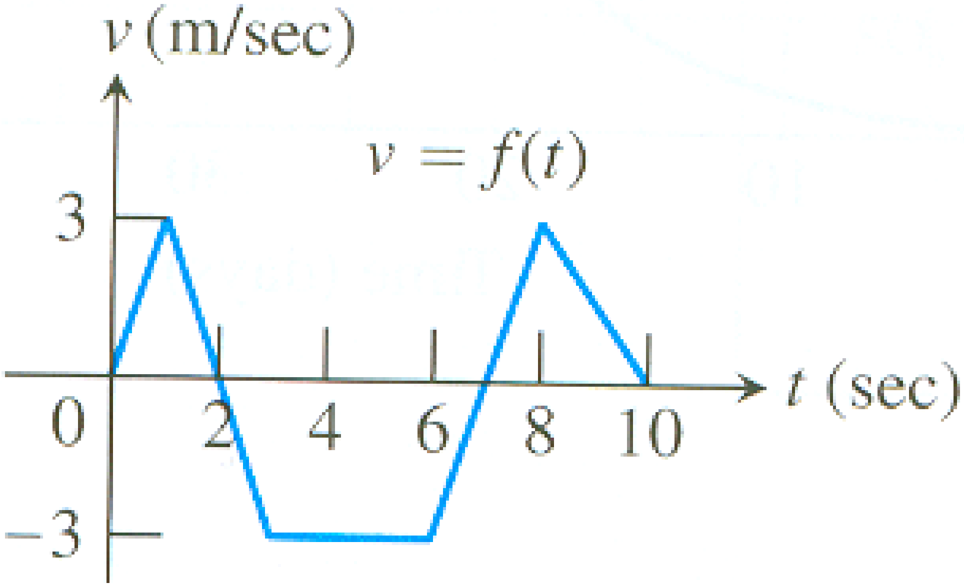
b. Graph the particles velocity.

p. 136 #10



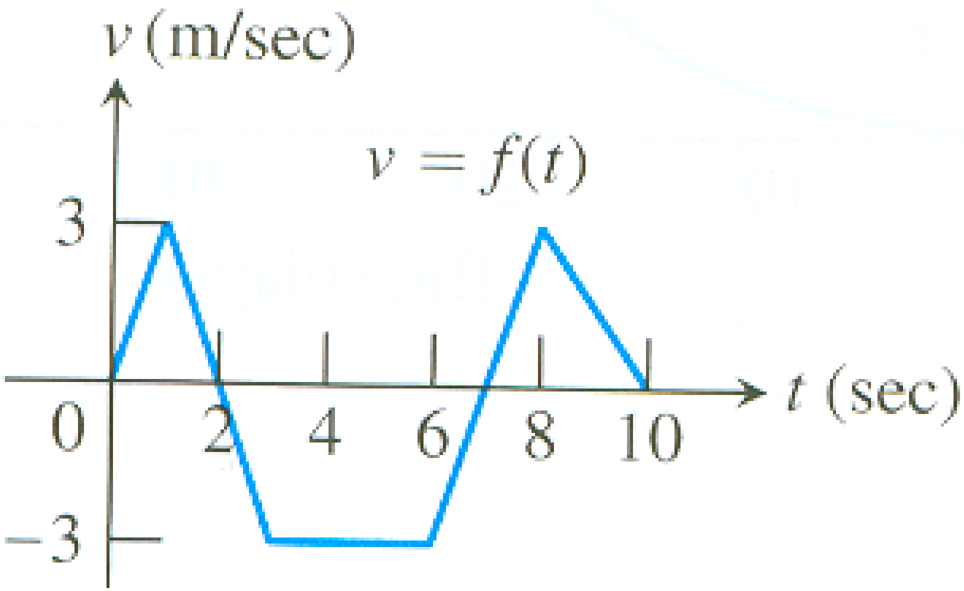
b. Graph the particles speed.

p. 136 #11



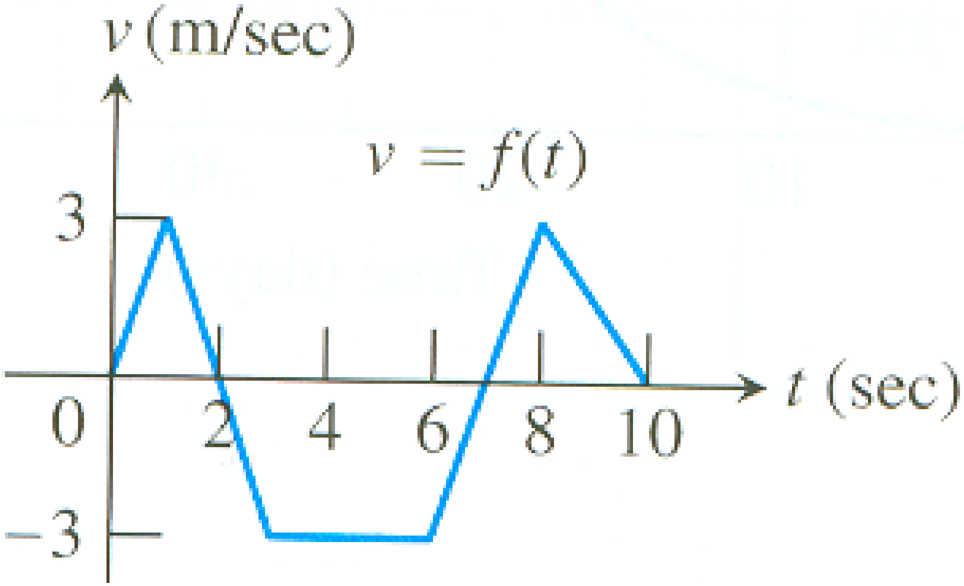
a. When does the particle reverse direction?

p. 136 #11



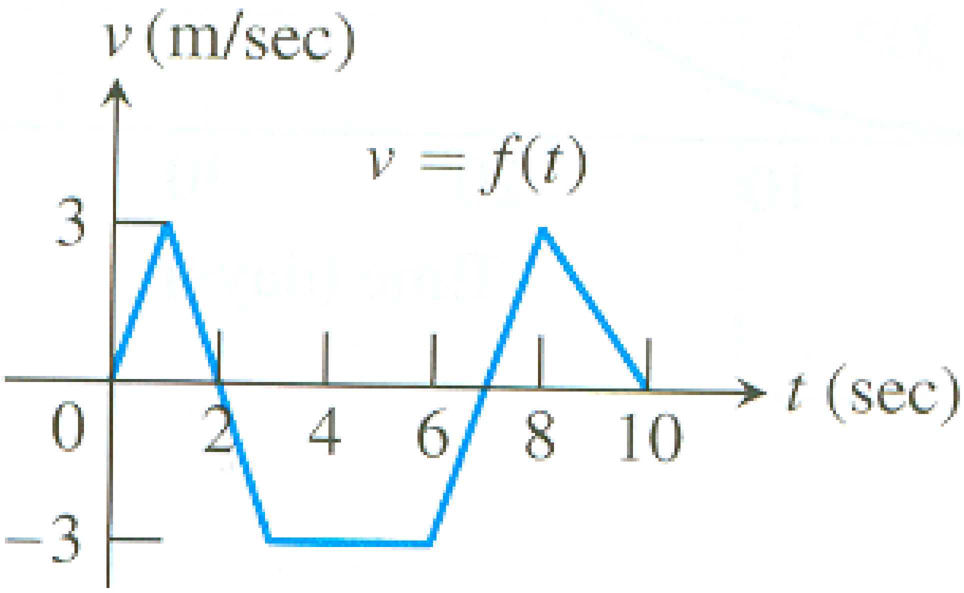
b. When is the body moving at a constant speed?

p. 136 #11



c. Graph the body's speed.

p. 136 #11



d. Graph the acceleration, where defined.

p. 137 19 a - e

- A particle moves along a line so that its position at any time t > 0 is given by the function $s(t) = t^2 - 3t + 2$, where is measured in meters and t is measured in seconds.

a) Find the displacement during the first 5 seconds.

p. 137 19 a - e

- A particle moves along a line so that its position at any time $t > 0$ is given by the function $s(t) = t^2 - 3t + 2$, where is measured in meters and t is measured in seconds.

b) Find the average velocity during the first 5 seconds.

p. 137 19 a - e

- A particle moves along a line so that its position at any time $t > 0$ is given by the function $s(t) = t^2 - 3t + 2$, where is measured in meters and t is measured in seconds.

c) Find the instantaneous velocity when $t = 4$

p. 137 19 a - e

- A particle moves along a line so that its position at any time $t > 0$ is given by the function $s(t) = t^2 - 3t + 2$, where is measured in meters and t is measured in seconds.

d) Find the acceleration when $t = 4$

p. 137 19 a - e

- A particle moves along a line so that its position at any time t > 0 is given by the function $s(t) = t^2 - 3t + 2$, where is measured in meters and t is measured in seconds.

e) At what values does the particle change direction

p. 137 19 a - e

- A particle moves along a line so that its position at any time $t > 0$ is given by the function $s(t) = t^2 – 3t + 2$, where is measured in meters and t is measured in seconds.

g) Describe the motion

p. 137 23

- The position of a body at time t sec is $s = t^3 - 6t^2 + 9t$ meters. Find the body's acceleration each time the velocity is zero.

p. 156 QQ #4

- A particle moves along a line so that its position at any time $t > 0$ is given by

$s(t) = -t^2 + t + 2$, where s is measured in meters and t is measured in seconds.

a) What is the initial position of the particle.

p. 156 QQ #4

- A particle moves along a line so that its position at any time $t > 0$ is given by

  $s(t) = -t^2 + t + 2$, where s is measured in meters

and t is measured in seconds.

b) Find the velocity of the particle at any time t.

p. 156 QQ #4

- A particle moves along a line so that its position at any time $t > 0$ is given by

  $s(t) = -t^2 + t + 2$, where s is measured in meters and t is measured in seconds.

c) Find the acceleration of the particle at any time t.

p. 156 QQ #4

- A particle moves along a line so that its position at any time $t > 0$ is given by $s(t) = -t^2 + t + 2$, where s is measured in meters and t is measured in seconds.

d) Find the speed of the particle at the moment when $s(t) = 0$.

p. 180 QQ #4

- A curve in the xy-plane is defined by $xy^2 - x^3y = 6$

a) Find dy/dx

p. 180 QQ #4

- A curve in the xy-plane is defined by $xy^2 - x^3y = 6$

b) Find an equation for the tangent line at each point on the curve with x-coordinate 1.

p. 180 QQ #4

- A curve in the xy-plane is defined by $xy^2 - x^3y = 6$

c) Find the x-coordinate of each point on the curve where the tangent line is vertical.

p. 162 #11

- Find dy/dx of the curve and the slope of the curve at the indicated point.

$$(x-1)^2+(y-1)^2=13 \qquad (3,4)$$

p. 162 #12

- Find dy/dx of the curve and the slope of the curve at the indicated point.

$$(x+2)^2+(y+3)^2=25 \qquad (1,-7)$$

p. 162 #13

- Find where the slope of the curve is defined.

$$x^2y - xy^2 = 4$$

p. 162 #17

- Find the lines that are tangent and normal to the curve at the point (2,3)

$$x^2 + xy - y^2 = 1$$

p. 162 #27

- Find the first and second derivative of the following

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

Bonus

- Find dy/dx if $x + \sin(xy) = y$

p. 202 1

- Find the value of c in the interval (a, b) that satisfies the mean value theorem.

$f(x) = x^2 + 2x - 1$ on $[0, 1]$

p. 242 2 $$f(x) = \sqrt{x^2 + 9},\ \mathrm{a} = -4$$

- Find the linearization L(x) of f(x) at x = a.
- Find L(a + .1) and f(a + .1)
- Then determine if the tangent line is above or below the curve at the value of a and give a reason for your answer.

p. 251 11

- A spherical balloon is inflated with helium at the rate of 100π ft^3/min.

a) How fast is the balloon's radius increasing at the instant the radius is 5 feet?

p. 251 11

- A spherical balloon is inflated with helium at the rate of 100π ft^3/min.

b) How fast is the surface area increasing at that instant?

p. 251 17

- Water is flowing at the rate of 50 m^3/min from a concrete conical reservoir (vertex down) of base radius 45 m and height 6 m.

a) How fast is the water level falling when the water is 5 m deep?

p. 251 17

- Water is flowing at the rate of 50 m^3/min from a concrete conical reservoir (vertex down) of base radius 45 m and height 6 m.

b) How fast is the radius of the water's surface changing at that same moment?

p. 251 19a

- A 13 ft ladder is leaning against a house when it's base starts to slide away. By the time the base is 12 feet from the house the base is moving at a rate of 5 ft/sec.

a) How fast is the top of the ladder sliding down the wall at that moment?

p. 450 2 Use L'hopitals rule to find the limit

$$\lim_{x \to 0} \frac{\sin(5x)}{x}$$

p. 450 6

Use L'hopitals rule to find the limit

$$\lim_{x \to \frac{\pi}{2}} \frac{1 - \sin(x)}{1 + \cos(2x)}$$

p. 450 8

- Use L'hopitals rule to find the limit

$$\lim_{x \to 2} \frac{x^2 - 4x + 4}{x^3 - 12x + 16}$$

p. 450 16

Use L'hopitals rule to find the limit

$$\lim_{x \to \infty} \frac{5x^2 - 3x}{7x^2 + 1}$$

p. 450 27 Use L'hopitals rule to find the limit

$$\lim_{x \to \infty} \frac{\ln(x^5)}{x}$$

p. 450 35 Use L'hopitals rule to find the limit

$$\lim_{x \to \infty} \frac{\log_2 x}{\log_3 (x+3)}$$

p. 153 46

Find the equation of the line tangent to the curve at the point defined by the given value of t

$$x = 2t^2 + 3 \quad \mathrm{y} = \mathrm{t}^4 \qquad \text{at t} = \text{-}1$$

p. 182 #51

Find the equation for the line tangent to the curve at the given value of t

$$x = 3\sec t \quad y = 5\tan t \qquad \text{at t} = \frac{\pi}{6}$$

p. 535 #25

Find the points at which the tangent line to the curve is horizontal and/or vertical

$$x = 2 - t \quad y = t^3 - 4t$$

1. A curve C is defined by the parametric equations $x = t^2 - 4t + 1$ and $y = t^3$. Find the equation of the line tangent to the graph of C at the point (1, 64)?

- A zoo sponsored a one-day contest to name a new baby elephant. Zoo visitors deposited entries in a special box between noon (t=0) and 8 P.M. (t=8). The number of entries in the box t hours after noon is modeled by a differentiable function E for . Values of E(T), in hundreds of entries, at various times t are shown in the table.

t(hours)	0	2	5	7	8
E(t) (hundreds of entries)	0	4	13	21	23

- Use the data in the table to approximate the rate at time t = 7.5. Show the computations that lead to your answer and explain the meaning of the found rate.

- A zoo sponsored a one-day contest to name a new baby elephant. Zoo visitors deposited entries in a special box between noon (t=0) and 8 P.M. (t=8). The number of entries in the box t hours after noon is modeled by a differentiable function E for . Values of E(T), in hundreds of entries, at various times t are shown in the table.

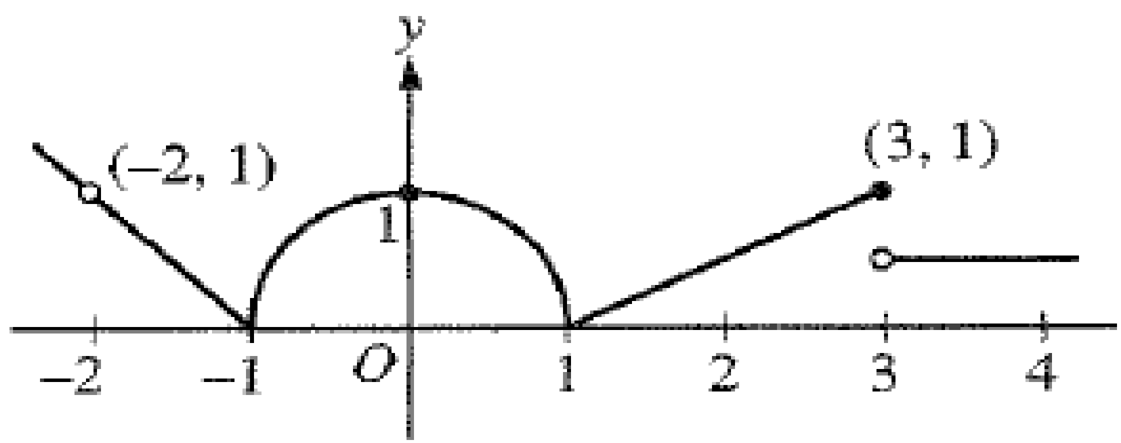
t(hours)	0	2	5	7	8
E(t) (hundreds of entries)	0	4	13	21	23

$$\text{Is there a time, t, between } 4 \le t \le 8 \text{ at which } E'(t) = \frac{19}{6}?$$

- The function f, whose graph consists of two line segments, is shown. Which of the following are true for f on the open interval (-2, 2)?

I. The domain of the derivative of f is the open interval (-2, 2)
II. f is continuous on the open interval (-2,2)
III. The derivative of f is positive on the open interval (-2, 2)

a) I only
b) II only
c) III only
d) II and III only
e) I, II, and III



Graph of f

If the function f is continuous at x = 5, which of the following must be true?

$$a)\ f(5) > \lim_{x\to 5} f(x)$$

$$b)\ \lim_{x\to 5^-} f(x) \neq \lim_{x\to 5^+} f(x)$$

$$c)\ f(5) = \lim_{x\to 5^-} f(x) = \lim_{x\to 5^+} f(x)$$

$d)$ The derivative of f at $x = 5$ exists

e) The derivative of f is negative for $x < 5$ and positive for $x > 5$