



## Problem Set 18: Critical Values and Particle Motion

Find the critical points of the function (just the x-values).

1.  $y = -4t^2 + 8t - 4$

2.  $y = 3x(x - 1)$

3.  $f(x) = -5\sqrt{5 - x}$

4.  $h(x) = \frac{x^2 + 2}{4x + 2}$

# AP Calculus AB – Unit 4



5. The position of a particle along the y-axis for any time  $t$  can be represented by the equation  $g(t) = t^4 - 4t^3 + 10$ .

a) What is the velocity of the particle at time  $t = 2$ ?

b) What is the acceleration of the particle at time  $t = 2$ ?

c) When does the particle stop?

d) When does the particle turn around?

# AP Calculus AB – Unit 4



6. A particle moves along the x-axis so that at time  $t > 0$  the position of the particle is  $x(t) = t \cdot \ln t$

a) What is the velocity of the particle at time  $t = 1$ ?

b) What is the acceleration of the particle at time  $t = 1$ ?

c) When does the particle stop?

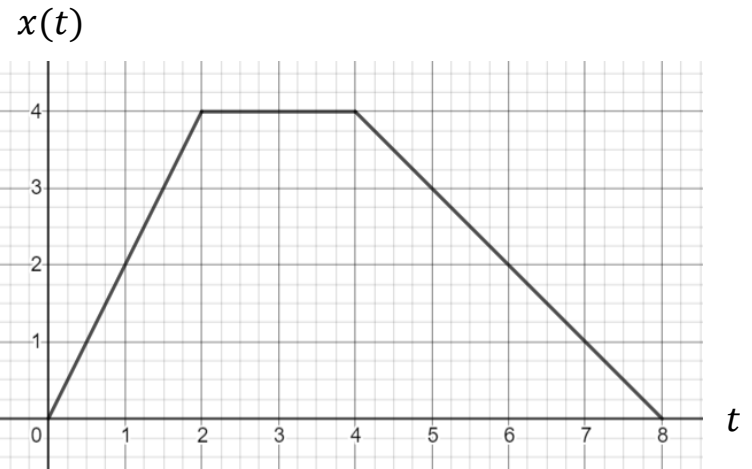
d) When does the particle turn around?

# AP Calculus AB – Unit 4



7. The position vs. time graph of a particle is shown. The position is measured in meters and the time is measured in seconds.

a) What is the position of the particle at 1, 3, and 5 seconds?



b) What is the velocity of the particle at 1, 3, and 5 seconds?

c) When is the particle at rest?

d) When is the particle moving to the right?

# AP Calculus AB – Unit 4

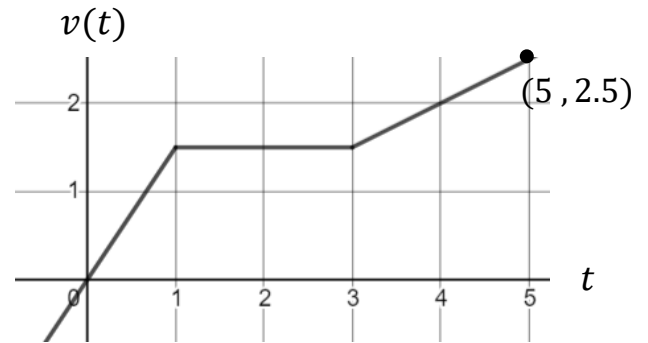
Dan the Tutor



Learn by Doing

8. The velocity vs. time graph of a particle is shown. The velocity is measured in m/s and the time is measured in seconds.

a) For  $0 \leq t \leq 5$ , when is the particle moving to the left? When is it moving to the right?



b) When is the particle at rest?

c) What is the particle's acceleration at  $t = \frac{1}{2}$ ,  $t = 2$ , and  $t = 4$ ?