

## Warm-Up

Let  $h(x) = f(x) \cdot g(x)$  and  $j(x) = \frac{f(x)}{g(x)}$

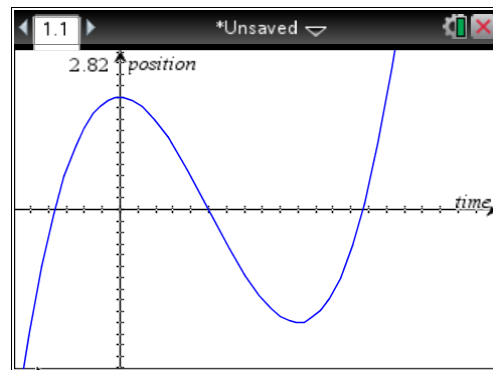
Fill in the missing entries in the table below using the information about  $f$  and  $g$  given in the table below.

x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$	$h'(x)$	$j'(x)$
-2	1	-1	-3	4		
-1	0	-2	1	1		
0		2	-2	1	4	
1	2		-1	2		-2
2	3	-1		-2		1

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### 3.4a Position, Velocity, Acceleration

How is the position of the particle related to the graph?



How is the velocity of the particle related to the graph?

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Position

Velocity

Speed

Acceleration

Displacement

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At time  $t = 0$ , a diver jumps from a platform diving board that is 32 ft. above the water. The position equation is:

$$s(t) = -16t^2 + 16t + 32$$

What is the displacement in the first 2 secs?

Average velocity in the first 2 secs?

What is the velocity at 2 secs?

What is the acceleration at 2 secs?

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The position of a particle that is moving in a straight line is given by the equation  $s = t^3 - 6t^2 + 9t$  where  $t$  is measured in seconds and  $s$  in meters.

(a) Find the velocity at time  $t$ .

(b) What is the velocity at 2s? At 4s?

(c) When is the particle at rest?

(d) When is the particle moving forward (that is, in the positive direction)?

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(e) Describe the motion of the particle.

(f) Find the displacement of the particle during the first 5 sec.

(g) Find the total distance traveled by the particle in the first 5 sec.

(h) Find the acceleration at time  $t$  and at 4s.

(i)  $0 \leq t \leq 5$   
Graph the position, velocity, and acceleration functions for

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Ex 4 p130

A dynamite blast propels a heavy rock straight up with a launch velocity of 160 ft/ sec. It reaches a height of

$$s(t) = 160t - 16t^2 \text{ after } t \text{ seconds.}$$

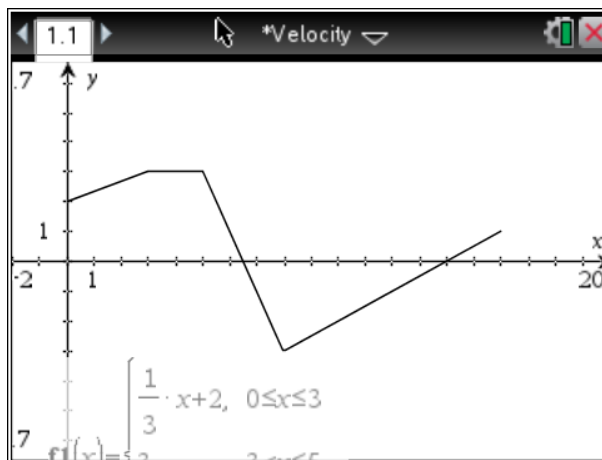
**Find**

- a) max height
- b) velocity and speed when height=256
- c) acceleration
- d) When the rock hits the ground

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### Position from Velocity

A particle moves along a horizontal line. The graphs shows its velocity. Describe the motion of the particle.



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