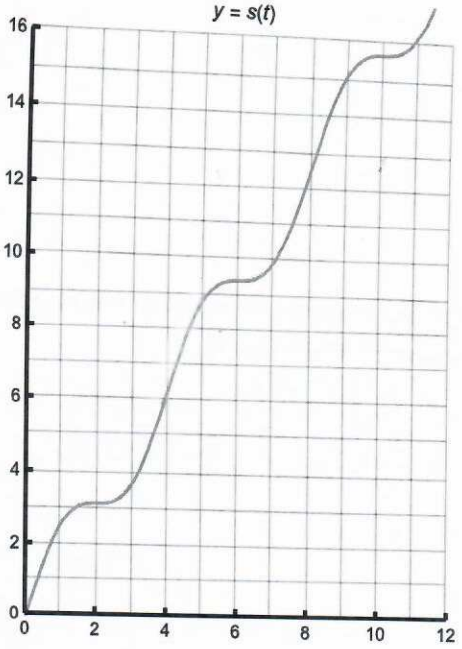
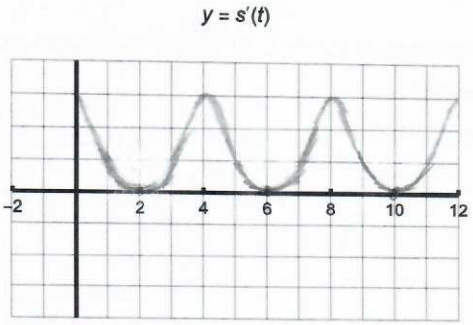
1. Preview Activity 1.6.1. The position of a car driving along a straight road at time in minutes is given by the function y=s(t) that is pictured below. The car's position function has units measured in thousands of feet. For instance, the point (4,6) on the graph indicates that after 4 minutes, the car has traveled 6000 feet.

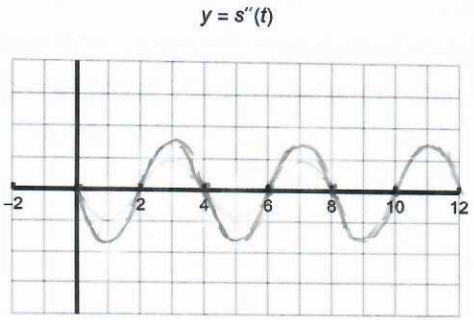
Out[205]=



At interval [0,2], the car slows until it comes to a stop at 2 min. At interval [2,4], the car begins to move again, increasing speed until 4 min. At time interval [4,6], the car slows and once again stops at 6 min. Overall, at interval [0,10], the car decreases its speed, stops, then starts moving at increasing speed in a pattern. It takes the car 4 minutes to decrease speed, stop, and begin increasing again.

Then it repeats!





Nice work

a. In the space to the right of the graph, and in everyday language, describe the behavior of the car over the provided time interval. In particular, you should carefully discuss what is happening on each of the time intervals [0,2], [2,4], and [4,6], plus provide commentary overall on what the car is doing on the interval [0,10].

"velocity" is better - both speed & direction.

b. On the lefthand axes provided below the graph, sketch a careful, accurate graph of s'(t).

c. What is the meaning of the function s'(t) in the context of the given problem? What can we say about the car's behavior when s'(t) is positive? when s'(t) is zero? when s'(t) is negative?

s'(t) represents the speed of the car in ft(1,000)/min at the given minute. When s'(t) is positive, the car is gaining distance. When s'(t) is 0, the car isn't moving. If s'(t) was negative, the car is going back the direction it came.

✓

d. Rename the function you graphed in (b) to be called y=v(t). Describe the behavior of v in words, using phrases like "v is increasing on the interval... " and "v is constant on the interval ...".

v is increasing on the intervals [2,4], [6,8], and [10,12].

v is decreasing on the intervals [0,2], [4,6], and [8,10]

v is constant at points 2, 6, and 10.

e. Sketch a graph of the function y=v'(t) on the righthand axes provided. Write at least one sentence to explain how the behavior of v' is connected to the graph of v.

v' represents the rate of change of the car's speed.

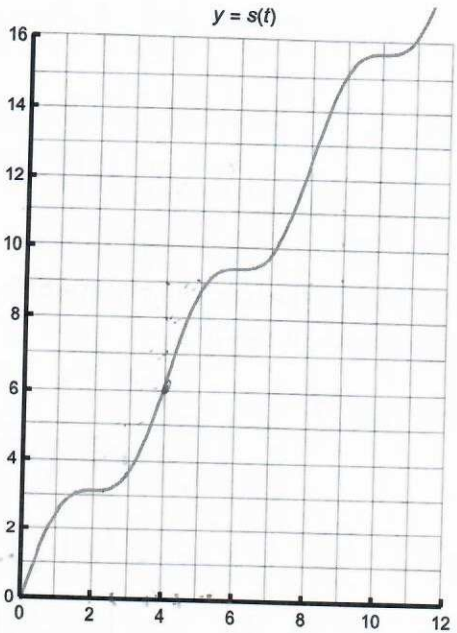
f. Explain how the graph of v' is connected to the behavior of s.

The graph of v' has y value 0 everytime the concavity changes on s, or the inflection point. If the concavity is down, y is negative, and if the concavity is up, y is positive.

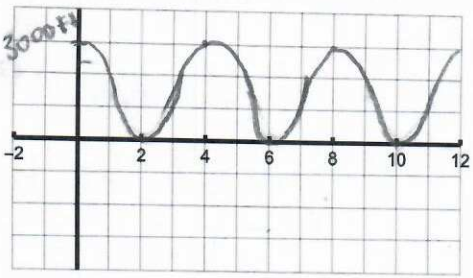
Well done.

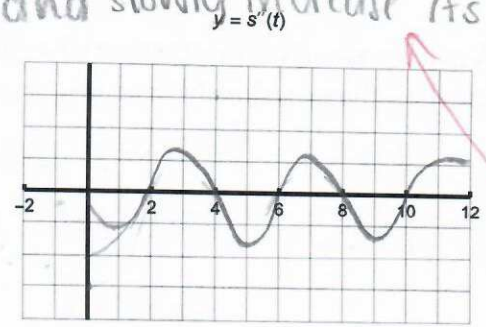
1. Preview Activity 1.6.1. The position of a car driving along a straight road at time in minutes is given by the function y=s(t) that is pictured below. The car's position function has units measured in thousands of feet. For instance, the point (4,6) on the graph indicates that after 4 minutes, the car has traveled 6000 feet.

Out[205]=



It appears the car has drive about 3,000 ft and stops after about 2 minutes of driving. possibly at a red light or stop sign. then after about 30 seconds. begins to travel an additional 6,500 ft in about 4 minutes to then stop for another 30 seconds. Overall, the car appears to stop 3 times. After 2, 6, and 10 minutes. the car doesn't come to a immediate stop. but rather slows down to each stop. and slowly increase its speed when it begins to go again.





accelerates!

a. In the space to the right of the graph, and in everyday language, describe the behavior of the car over the provided time interval. In particular, you should carefully discuss what is happening on each of the time intervals [0,2], [2,4], and [4,6], plus provide commentary overall on what the car is doing on the interval [0,10].

b. On the lefthand axes provided below the graph, sketch a careful, accurate graph of s'(t).

c. What is the meaning of the function s'(t) in the context of the given problem? What can we say about the car's behavior when s'(t) is positive? when s'(t) is zero? when s'(t) is negative?

this graph displays the rate/speed the car is traveling in ft/s. When it is positive, the car is moving forwards. When it is zero, the car is stopped. When it is negative (but it isn't in this graph) it would mean it is traveling negative distance. (It is never negative on this graph.

d. Rename the function you graphed in (b) to be called y=v(t). Describe the behavior of v in words, using phrases like "v is increasing on the interval... " and "v is constant on the interval ...".

v is increasing on the intervals $(0, 1.75)$ $(2.25, 5.75)$ $(6.25, 9.75)$ $(10.25, 12)$

v is constant on the intervals $[1.75, 2.25]$ $[5.75, 6.25]$ $[9.75, 10.25]$

e. Sketch a graph of the function y=v'(t) on the righthand axes provided. Write at least one sentence to explain how the behavior of v' is connected to the graph of v.

$y = v'(t)$ shows how fast or how slow the velocity changes over the course of the trip

f. Explain how the graph of v' is connected to the behavior of s.

v' is the graph of each instantaneous velocity at each s.

It shows the change in velocity at each s.

(acceleration)