Questions on 3.5 HW {pg.135-137 #3-30 (X3)}?

(15) $s = 24t - 4.9t^2$

$s = t(24 - 4.9t)$

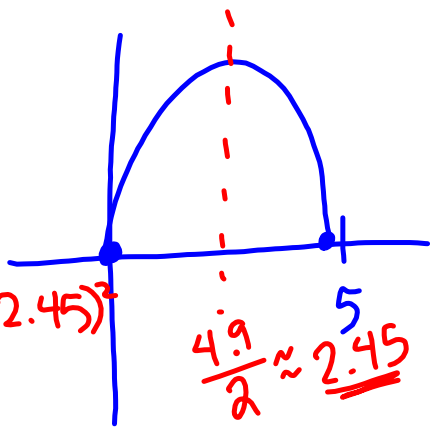
$0 = t(24 - 4.9t)$

$t = 0, \frac{24}{4.9} \approx 4.9$

$24 - 4.9t = 0$

$\frac{24}{4.9} = \frac{4.9t}{4.9}$

$4.9 \approx t$



$s(2.45) = 24(2.45) - 4.9(2.45)^2$

$s(2.45) = 29.388$ m

(24) $v = 2t^3 - 9t^2 + 12t - 5$ m/sec

$a(t) = v' = 6t^2 - 18t + 12$

$0 = 6t^2 - 18t + 12$

$0 = 6(t^2 - 3t + 2)$

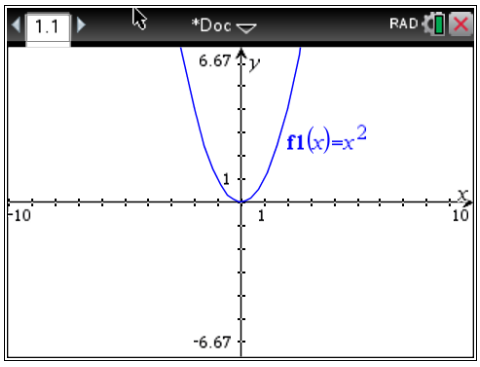
$0 = 6(t - 2)(t - 1)$

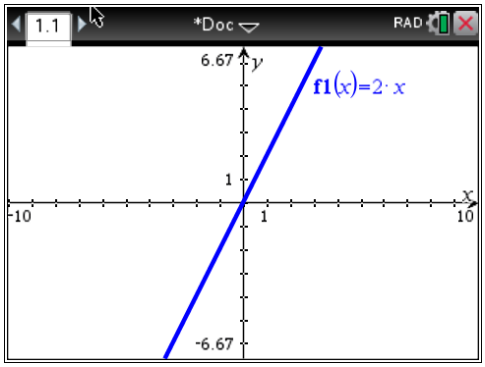
$t = 2, 1$ sec.

$v(1) = 0$ m/s

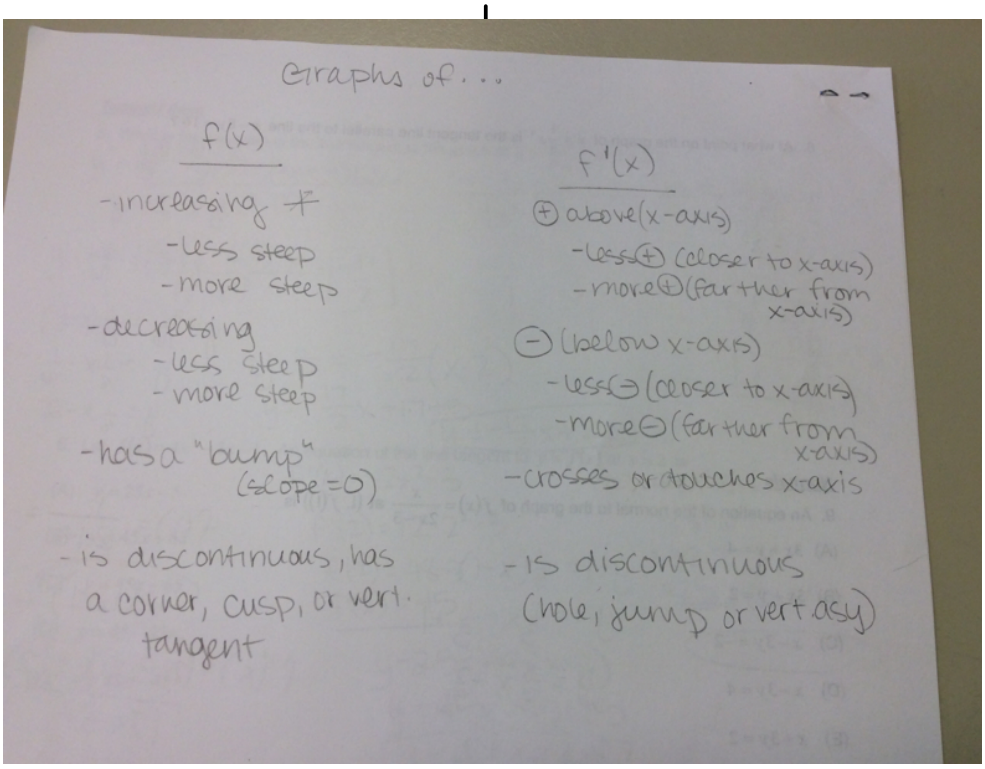
$v(2) = -1 \rightarrow 1$ m/s

Here's a f(x).....and its f'(x)





Comparing f(x) and f'(x)...



Graph Match Activity

Answers

A	6
B	7
C	3
D	11
E	4
F	8
G	12
H	2
I	1
J	9
K	5
L	10

Oct 12-2:57 PM

3.6 More Position, Velocity, Acceleration

Important Terms	
Position Function	gives the location of an object at time t, usually $s(t)$, $x(t)$, or $y(t)$
Velocity Function	the rate of change (derivative) of position, usually $v(t)$ Velocity is positive for upward or rightward motion and negative for downward or leftward motion.
Acceleration Function	the rate of change (derivative) of velocity, usually $a(t)$
Initial Position	starting position (at $t = 0$), s_o
Initial Velocity	starting velocity (at $t = 0$), v_o
Speed	the absolute value of velocity
Displacement	the net change in position, (final pos. – original pos.)
Total Distance	total distance traveled by the object in the time interval (takes into account all direction changes)

Example 1. If $s(t) = t^3 + t$, find $v(t)$ and $a(t)$.

$s'(t) = v(t) = 3t^2 + 1$

$s''(t) = v'(t) = a(t) = 6t$

Oct 6-7:43 AM

Examples: Use the position function $s(t) = 16t^3 - 36t^2 + 24$ of an object moving on a horizontal line for Examples 2-11. Distance units are measured in feet and time units are measured in seconds.

2. What is the initial position of the object?

$s(0) = 24$

3. What is the velocity of the object at $t = 1$ second?

$v(t) = 48t^2 - 72t$

$v(1) = 48 - 72 = -24$ ft/sec

4. What is the speed of the object at $t = 1$ second?

speed = 24 ft/sec

5. What is the acceleration of the object at $t = 1$ second?

$a(t) = 96t - 72$

$a(1) = 96 - 72 = 24$ ft/sec^2

6. When is the object at rest?

when $v(t) = 0$

$0 = 48t^2 - 72t$

$0 = 24t(2t - 3)$

$t = 0, 3/2$ sec.

7. When is the object moving right?

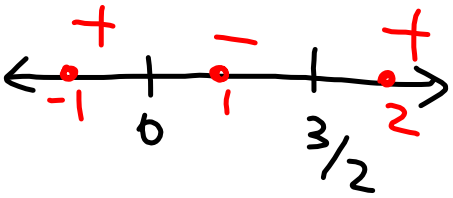
when $v(t) > 0$

$t < 0$ and $t > 3/2$

8. When is the object moving left?

when $v(t) < 0$

$0 < t < 3/2$



9. When is the velocity of the object equal to 54 $\frac{ft}{sec}$?

$54 = 48t^2 - 72t$

$48t^2 - 72t - 54 = 0$

doesn't factor nicely...

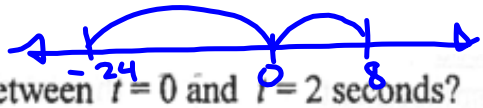
$t = -0.549, 2.05$

10. What is the displacement of the object between $t = 0$ and $t = 2$ seconds?

$s(2) - s(0) =$

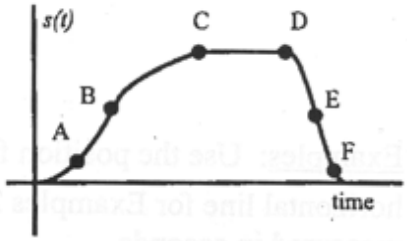
$8 - -24 =$

$8 + 24 = 32$



11. What is the total distance traveled by the object between $t = 0$ and $t = 2$ seconds?

The graph shows the position function of a radio controlled model car. Answer these questions and explain.



12. Was the car going faster at A or at B?

13. When was the car stopped?

14. At which point was the car's velocity the greatest?

15. At which point was the car's speed the greatest?

Vertical Motion Examples:

Suppose $s(t) = -16t^2 + 48t + 160$ gives the position (in feet) above the ground for a ball thrown into the air from the top of a high cliff (where time is measured in seconds).

16. Find the initial velocity.

17. At what time does the ball hit the ground?

Oct 19-12:33 PM

Homework

3.6 Worksheet

Oct 21-8:47 AM