Notes
$\boxed{5.4}$
4/24/06

Rectilinear motion

position/displacement $x(t)$, $s(t)$
velocity $v(t) = s'(t) = \frac{ds}{dt}$
acceleration $a(t) = v'(t) = \frac{dv}{dt} = s''(t) = \frac{d^2s}{dt^2}$

Signs	+	−	
$s(t)$:	particle is right of the origin	particle is to left of origin	if $s=0$ particle is at origin
$v(t)$:	particle moving to the right (or positive dirn)	particle moving to the left	if $v=0$ particle is stopped
$a(t)$:	$v+ \Rightarrow$ speeding up $v- \Rightarrow$ slowing down	$v+ \Rightarrow$ slowing down $v- \Rightarrow$ speeding up	

speed $= |v(t)|$

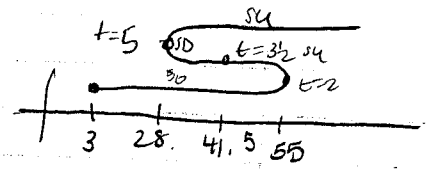
$s(t) = 2t^3 - 21t^2 + 60t + 3$

$v(t) = 6t^2 - 42t + 60 = 0$

$t^2 - 7t + 10 = 0$

$(t-5)(t-2) = 0$

stopped $t = 2, 5$



$a(t) = 12t - 42 = 0$

$t = 3\frac{1}{2}$ sec

t	s	v	a	
0	3	+	−	
0−2		+	−	slowing down
2	55	0	−	
$2-3\frac{1}{2}$		−	−	speedingup
$3\frac{1}{2}$	41.5	−	0	
$3\frac{1}{2}-5$		−	+	slowing down
5	28	0	+	
>5		+	+	speedingup