Calc BC Pg 135 # 10, 13, 14, 20, 22, 24, 31

(10) a) left; $v(t) < 0$

$2 < t < 3,\ 5 < t \leq 6$

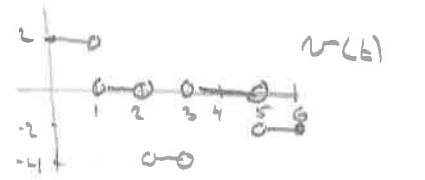
right; $v(t) > 0$

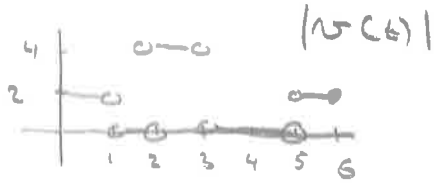
$0 \leq t < 1$

still, $v(t) = 0$

$1 < t < 2,\ 3 < t < 5$

b)





(13) $s(t) = 24t - .8t^2$

a) $v(t) = 24 - 1.6t$ m/s

$a(t) = -1.6$ m/s²

b) $v(t) = 0$

$24 - 1.6t = 0$

$t = 15$ s

c) $s(15) = 180$ m

d) $24t - .8t^2 = 90$

$t \approx 4.393$ sec (quadform)

e) $s(t) = 0$, $t = 30$

(19) $s(t) = t^2 - 3t + 2$

a) $s(0) = 2$

$s(5) = 12$ → 10 m

b) $\frac{s(5) - s(0)}{5 - 0} = \frac{10}{5} = 2$ m/s

c) $v(t) = 2t - 3$; $v(4) = 5$ m/s

d) $a(t) = 2$; $a(4) = 2$ m/s²

e) $2t - 3$: − | +

⊖ $\frac{3}{2}$ ⊕

direction change @ $t = \frac{3}{2}$

(7) min at $\left(\frac{3}{2}, s\left(\frac{3}{2}\right)\right) = \left(\frac{3}{2}, -\frac{1}{4}\right)$

(20) $s(t) = -t^3 + 7t^2 - 14t + 8$

a) $v(t) = -3t^2 + 14t - 14$

b) $a(t) = -6t + 14$

c) $-(3t^2 + 14t - 14) = 0$

$t \approx 1.451$, $t = 3.215$ (quadform)

d) $v(t)$: ⊖ | ⊕ | ⊖

$t = 1.451$ $t = 3.215$

moves left until $t = 1.451$, moves right from $t = 1.451$ to $t = 3.215$ then moves left again

(22) $s(t) = t^3 - 6t^2 + 8t + 2$

a) $v(t) = 3t^2 - 12t + 8$

b) $a(t) = 6t - 12$

c) $v(t) = 0$

$t \approx 0.845,\ t \approx 3.155$

d) moves right from $t=0$ to $t = 0.845$, moves left from $0.845 < t < 3.155$, then moves right

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

$a(t) = 6t^2 - 18t + 12$

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

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

$a(t) = 0$ at $t=1,\ t=2$

$|v(1)| = |0| = 0$

$|v(2)| = |-1| = 1$

(31) C is Position

A is Velocity

B is acceleration