

P41 49, 51, 53

- (49) (a) 50s
(b) 90s - 109s (horizontal line)
(c) 0 - 40s (straight line)
(d) ~110s (greatest slope)

- (51) (a) 0 - 15s (straight line)
(b) ~27s (greatest slope)
(c) ~35 - 40s (zero slope)
(d) both directions (forward until 37s, then backwards)

(53) (a) $a = \frac{\Delta v}{\Delta t} = \frac{(13-0) \text{ ms}^{-1}}{(2-0) \text{ s}} = 6.5 \text{ ms}^{-2}$

(b) $a = \frac{\Delta v}{\Delta t} = \frac{(37-23) \text{ ms}^{-1}}{(13-9) \text{ s}} = 3.5 \text{ ms}^{-2}$

(c) $a = \frac{\Delta v}{\Delta t} = \frac{(52-43) \text{ ms}^{-1}}{(50-27) \text{ s}} = 0.39 \text{ ms}^{-2}$

(d) $a = \frac{\Delta v}{\Delta t} = \frac{(43-0) \text{ ms}^{-1}}{(27-0) \text{ s}} = 1.59 \text{ ms}^{-2}$

(answers may vary due to estimation from graph)