Chapter 7

Review Video

p. 386 #4 $v(t) = 6t^2 - 18t + 12$ $0 \le t \le 2$

a. Determine when the particle is moving to the right, to the left, and stopped

$v(t) = 0$

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

$0 = t^2 - 3t + 2$

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

$t = 2 \quad t = 1$

$v(0) = 12 > 0$ right $(0,1)$

$v\left(\frac{3}{2}\right) = 6\left(\frac{3}{2}\right)^2 - 18\left(\frac{3}{2}\right) + 12$

$= 6\left(\frac{9}{4}\right) - 27 + 12$

$= \frac{27}{2} - 27 + 12$

$= 13.5 - 27 + 12 < 0$

Left $(1,2)$

p. 386 #4 $v(t) = 6t^2 - 18t + 12$ $0 \le t \le 2$

b. Find the particle's displacement for the given time interval.

$$\int_0^2 6t^2 - 18t + 12 = 2t^3 - 9t^2 + 12t \Big]_0^2$$

$$= \left[2(2)^3 - 9(2)^2 + 12(2)\right] - \left[0\right]$$

$$= 16 - 36 + 24$$

$$= 4 \text{ meters}$$

p. 386 #4 $v(t) = 6t^2 - 18t + 12$ $0 \leq t \leq 2$

c. If s(0) = 3, what is the particle's final position?

3 + 4 = 7 meters

p. 386 #4 $v(t) = 6t^2 - 18t + 12$ $0 \le t \le 2$

d. Find the total distance traveled by the particle.

$$\int_0^2 |v(t)|\,dt = \int_0^1 v(t) + \int_1^2 |v(t)|$$

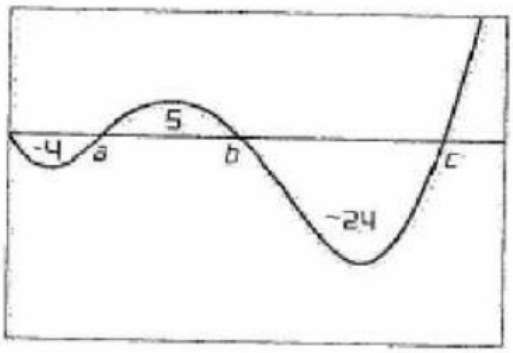
$$= 2t^3 - 9t^2 + 12t \Big]_0^1 + \left| 2t^3 - 9t^2 + 12t \right|_1^2$$

$$= (5) + |(4) - (5)|$$

$$= 6 \text{ meters}$$

p. 386 #12-16

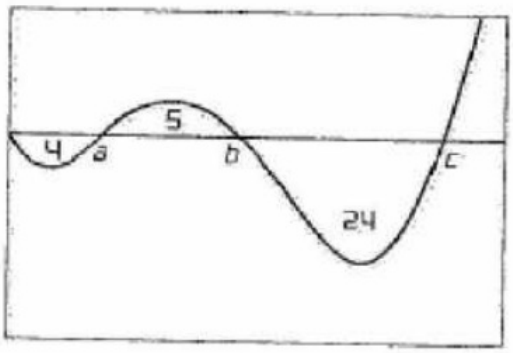
12. What is the particle's displacement between t = 0 and t =c



$-4 + 5 - 24 = -23$

p. 386 #12-16

13. What is the total distance traveled between t = 0 and t =c

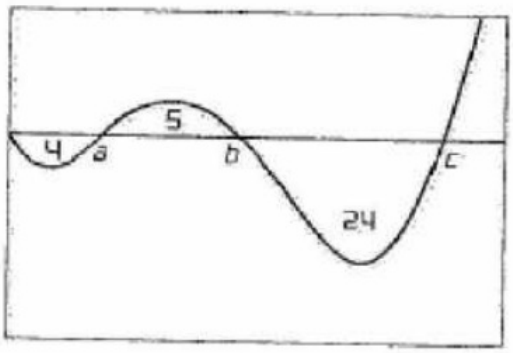


$4 + 5 + 24 = 33$

$s(0) = 15$

p. 386 #12-16

14. Give the positions of the particle at times a, b, and c.



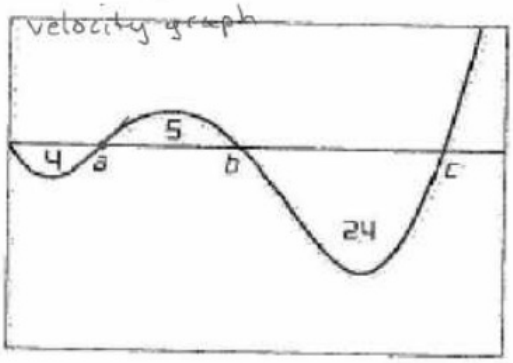
$s(a) = 15 - 4 = 11$

$s(b) = 11 + 5 = 16$

$s(c) = 16 - 24 = -8$

p. 386 #12-16

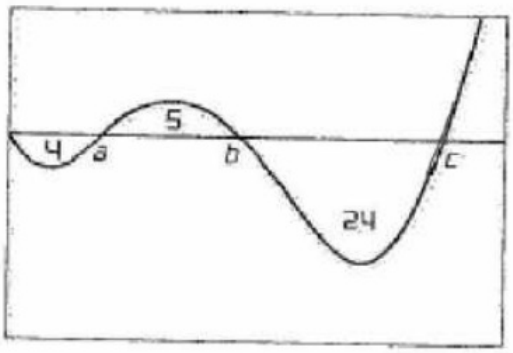
15. Approximately where does the particle achieve its greatest positive acceleration on the interval [0, b]



a

p. 386 #12-16

15. Approximately where does the particle achieve its greatest positive acceleration on the interval [0, c]



C