Sec 3.8 day 2 page 238 (8, 9, 11, 13ab, 14, 15, 18, 29, 30)

(8) $s = 5t + 3t^2$

a) $v(t) = 5 + 6t$

$v(2) = 17$ m/s

b) $35 = 5 + 6t$

$t = 5$ so at 5 sec.

(9) $h = 10t - 0.83t^2$

a) $v(t) = 10 - 1.66t$

$v(3) = 5.02$ m/s

b) $h = 25$

$25 = 10t - 0.83t^2$

polysmlt

$t = 3.54$ or 8.51

so at 3.54 (at 8.51 it's on its way back down)

$\therefore v(3.54) \approx 4.12$ m/s.

(11) a) $A(x) = x^2$

$A'(x) = 2x$

$A'(15) = 30$ mm^2/mm

This is the rate at which the area increases as the lengths approach 15mm.

b) $A'(x) = 2x \qquad P = 4x$

$\frac{P}{2} = \frac{4x}{2} = 2x = A'(x)$

(13) a) $A = \pi r^2$

i) $\frac{\pi(3)^2 - \pi(2^2)}{1} = 5\pi$ ii) $\frac{2.5^2\pi - 2^2\pi}{.5} = 4.5\pi$

iii) $\frac{2.1^2\pi - 2^2\pi}{.1} = 4.1\pi$

b) $A' = 2\pi r$

$A'(2) = 2\pi(2) = 4\pi$

(14) $r = 60t$ so $A = \pi r^2 = \pi(60t)^2$

$A = 3600t^2\pi$

$A' = 7200t\pi$

a) $= A'(1) = 7200\pi\ cm^2/s$

b) $= A'(3) = 21,600\pi\ cm^2/s$

c) $= A'(5) = 36,000\pi\ cm^2/s$

we can conclude that it is linear.

(15) $S = 4\pi r^2$

$S' = 8\pi r$

a) $= 8\pi\ ft^2/ft$

b) $= 16\pi\ ft^2/ft$

c) $= 24\pi\ ft^2/ft$

we can conclude that it is linear

(18) $V = 5000\left(1 - \frac{1}{40}t\right)^2 \quad 0 \le t \le 40$

$V' = 10{,}000\left(1 - \frac{1}{40}t\right)\left(-\frac{1}{40}\right)$

$= -250\left(1 - \frac{1}{40}t\right)$

a) -218.75 gal/min

b) -187.5 gal/min

c) -125 gal/min

d) 0 gal/min

fastest at the beginning

slowest at the end

b/c as water escapes the pressure lessons.

(29) $C(x) = 1200 + 12x - 0.1x^2 + 0.0005x^3$

a) $C'(x) = 12 - .2x + 0.0015x^2$ $/yd

b) $C'(200) = \$32/yd$ the rate at which cost increases with respect to x when x = 200. This predicts the cost of the 201st yard.

c) $C(201) - C(200) = \$32.20$

(30) a) $C'(100) = \$19$/item

b) $C(101) - C(100) = \$19.03$