2.2 Rates of Change

Pg. 115 #'s 47-51 odd, 61, 70, 87-92, 97, 98, 101-105 odd

47) $y = x(x^2+1)$

$y = x^3 + x$

$y' = 3x^2 + 1$

49) $f(x) = x^{1/2} - 6x^{1/3}$

$f'(x) = \frac{1}{2}x^{-1/2} - 2x^{-2/3}$

$f'(x) = \frac{1}{2x^{1/2}} - \frac{2}{x^{2/3}}$

51) $f(x) = 6x^{1/2} + 5\cos x$

$f'(x) = 3x^{-1/2} - 5\sin x$

$f'(x) = \frac{3}{\sqrt{x}} - 5\sin x$

61) $y = x + \sin x \quad 0 \le x \le 2\pi$

$y' = 1 + \cos x$

$0 = 1 + \cos x$

$\cos x = -1$

$x = \pi$

70) a) A and B

b) Greater than

c)

87) False

$f(x) = 2x + 2$

$g(x) = 2x + 3$

88) True

89) False

π is constant

$\frac{dy}{dx} = 0$

90) True

91) True

92) False

$f(x) = \frac{1}{x^n} = x^{-n}$

$f'(x) = -n x^{-n-1}$

$f'(x) = \frac{-n}{x^{n+1}}$

97) a) $s(t) = -16t^2 + 1362$

$v(t) = -32t$

b) $\frac{s(2) - s(1)}{2 - 1} = \frac{1298 - 1346}{1} = -48$ ft/s

c) $v(1) = -32$ ft/s

$v(2) = -64$ ft/s

d) $0 = -16t^2 + 1362$

$16t^2 = 1362$

$t^2 = 85.125$

$t \approx 9.226$ seconds

e) $v(9.226) \approx -295.242$ ft/s

98) $s(t) = -16t^2 - 22t + 220$

$v(t) = -32t - 22$

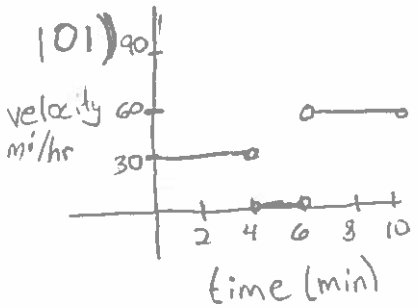
$v(3) = -32(3) - 22 = -118$ ft/s

$108 = -16t^2 - 22t + 220$

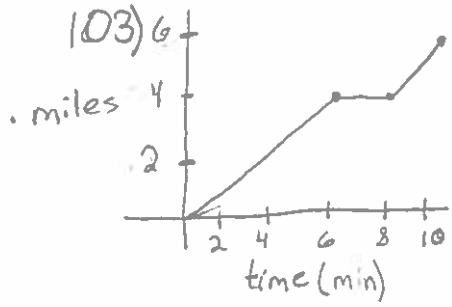
$t \approx 2.046$

$v(2.046) \approx -87.476$ ft/s

101)



103)



105) $V = s^3$

$\frac{dV}{ds} = 3s^2$

$\frac{dV}{ds}(6) = 3(6)^2$

$= 108$ cm^3/cm