

REVIEW WS: SECTIONS 3.5-3.9**THIS FOCUSES ON THE 2ND HALF OF THE CH - REVIEW YOUR HW & NOTES OF THE FIRST ½ OF THE CH******YOU MUST SHOW ALL WORK ON A SEPARATE SHEET OF PAPER******SECTION 3.5**

- 1) Suppose $h(x) = f(g(x))$, $f'(7) = 3$, $g(4) = 7$, and $g'(4) = 5$. Find $h'(4)$.

2) Find $\frac{dy}{dx}$ for:

a) $y = \sqrt{x^3 + 6x}$

b) $y = \sec x^2$

c) $y = \sec^2 x$

d) $y = \cos^3 x^2$

e) $y = \sin 2x \cos 3x$

f) $y = \sin(\sec x)$

g) $y = \tan(x^2 + 1)^4$

h) $y = \frac{1}{(x^2 - 1)^4}$

i) $y = x^3 \sqrt{x^2 + 1}$

- 4) The temperature at noon each day x at the top of Mt. Arthur is approximately

$$50 + 30 \sin \frac{\pi(x - 200)}{180}$$

degrees Fahrenheit. (Assume a 360 day year.) Find the rate of change of the daily temperature for January 15.

SECTION 3.6

3) Find $\frac{dy}{dx}$ implicitly:

a) $x^2 y^3 = 2x + 1$

b) $3x^2 - 5xy + y^2 = 10$

- 4) Find the slope of the tangent line to the curve defined by $x^2 + 2xy - y^2 = 41$ at the point $(5, 2)$.

- 5) For $x^2y = 1$ find y' both explicitly and implicitly.

SECTION 3.7

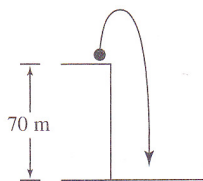
- 1) Water is flowing out of a tank in such a fashion that after t minutes there are $10000 - 10t - t^3$ gallons of water in the tank. How fast is the water flowing after 2 minutes?
- 2) A space shuttle is $16t + t^3$ meters from its launch pad t seconds after liftoff. What is its velocity after 3 seconds?

- 3) A particle is moving along an axis so that at time t its position is

$$f(t) = t^3 - 6t^2 + 6 \text{ feet.}$$

- a) What is its velocity at time t ?
- b) What is the velocity at 3 seconds?
- c) Is the particle moving left or right at 3 seconds?
- d) At what time(s) is the particle (instantaneously) motionless?

- 4) A stone is thrown upward from a 70 m cliff so that its height above ground is $f(t) = 70 + 3t - t^2$. What is the velocity of the stone as it hits the ground?



- 5) The number of yellow perch in a bay in Lake Michigan was measured annually over a six year period. See the table. Estimate the rate of change of the perch population in the bay in 2004.

t	$P(t)$ (thousands of fish)
2001	420,000
2002	400,000
2003	370,000
2004	360,000
2005	330,000
2006	310,000

SECTION 3.9

- 1) Find the linear approximation to $f(x) = 5x^3 + 6x$ at $x = 2$.
- 2) Approximate $f(1.98)$ for the function in question 1.
- 3) Use a calculator to find $\sqrt{66}$, then approximate $\sqrt{66}$ using a linear approximation.
- 4) Find the linear approximation of $f(x) = \sin x$ at $a = 0$. Use it to estimate $\sin\left(\frac{\pi}{15}\right)$.