

Business Calculus, Summer 2004

Homework #2

Due: Tuesday, July 13th, 2004 by end of class

- Find the equation for the line
 - through the points $(-3, 2)$ and $(1, 0)$
 - with slope $m = 4/3$ and passing through the point $(4, 1)$
 - with slope $m = -2$ and y-intercept π
 - with slope $m = -3/2$ and x-intercept 4
- A hot dog vendor knows that he can sell 750 hot dogs a day for \$1.50 each, but only 500 per day at \$2.00 each. Let x be the number of hot dogs per day he can sell at p dollars per hot dog. Given that there's a straight-line relationship between p and x , find the demand function $p = p(x)$ for the hot dogs.
 - Each hot dog costs the vendor \$0.80. On top of that he faces fixed costs of \$50 per day. Find a straight-line formula for the cost C of selling x hot dogs per day.
 - Find the revenue and profit functions for the vendor. How many hot dogs does he have to sell each day in order to break even?
- On a road trip the distance covered after t hours is given by the function $d = d(t) = \frac{1}{3}t^2 + 2t$. Find the average velocity between times
 - $t = 3$ and $t = 4$, (b) $t = 3$ and $t = 4$
 - $t = 3$ and $t = 3.5$, (d) $t = 3$ and $t = 3.1$Can you guess the instantaneous velocity at time $t = 3$?
- Use the "Delta Process" from Section 2.2 to find the instantaneous rate of change of the function $f(t) = t^2 + 3t + 4$ at any time t .
- Use the rule $\frac{d}{dx}(x^n) = nx^{n-1}$ to find the derivative of $\frac{75}{4}x^4 + 19x^3 - \frac{14}{3}x^2 + 2x - 7$.
- Find the derivative of $(x^4 - x^2 + 2x)(12x^3 + 6x^2 - 1)$ in two ways:
 - Multiply out the expression above then take the derivative.
 - Use the product rule from Section 3.1, and then multiply out your final answer and collect all like terms.