

## Higher Order Derivatives

1. 2-11

For the following functions, find  $f'(x)$  and  $f''(x)$ .

1)  $f(x) = 4x^3 - 9x^2 + 6$

2)  $f(x) = 4(x+7)^4$

3)  $f(x) = \frac{4x^2}{4+x}$

4)  $f(x) = \sqrt{x+9}$

5)  $f(x) = x + 32x^{-2}$

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

7)  $f(x) = 3\sin x + \tan x$

8)  $f(x) = \frac{x^2 + 2x - 1}{x}$

9)  $f(x) = 4\sqrt{x} + 7\sqrt[5]{x^3} - \frac{1}{\sqrt{x}} - 3x^{2/3}$

10) The ordering and transportation cost  $C$  for the components used in manufacturing a certain product is  $C = 100 \left( \frac{200}{x^2} + \frac{x}{x+30} \right)$  where  $C$  is in thousands of dollars and  $x$  is the order size in hundreds. Find the rate of change of  $C$  when  $x=10$ ,  $x=15$ , and  $x=20$ .

11) The position function for a car is modeled by  $s(t) = -8.25t^2 + 66t$ . Use this function to complete the table and answer the questions.

$t$	0	1	2	3	4
$s(t)$					
$v(t)$					
$a(t)$					

a) What is the average velocity of the car from  $t=0$  to  $t=4$ ?

b) Use the table to find  $s'(2.5)$ .