

Homework # 3

Due: 6/6/06

1. Find an equation of the tangent line to $y = \sqrt{2x + 1}$ at the point (4,3).
2. Draw a graph of a function f that has the properties

$$\begin{aligned}g(0) &= 0 & g'(0) &= 3 \\g'(1) &= 0 & g'(2) &= 1\end{aligned}$$

3. Use the limit definition of the derivative to compute $f'(a)$ if $f(x) = \frac{x^2+1}{x-2}$
4. Find $f'(x)$ and find the points where the tangent line is horizontal if $f(x) = x^2 + 2x + 1$. Again, use the limit definition of the derivative.
5. Find $f'(x)$ and its domain for

(a) $f(x) = \frac{\sqrt{x+1}}{\sqrt{x-1}}$

(b) $f(x) = x^2 + x + x^{-1} + x^{-2}$

(c) $f(x) = (x - 1)\sqrt{x}$

6. A particle moves according to $s = f(t) = t^4 - 4t + 1$ for $t \geq 0$, where t is seconds and s is feet.
 - (a) Find the velocity at time t
 - (b) When is the particle at rest?
 - (c) When is the particle moving in the negative direction?
 - (d) Find the total distance traveled during the first 8 seconds.