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Instantaneous Velocity Equation
$\lim _{x \rightarrow a} \frac{f(t)-f(a)}{t-a}$

1) Eddie is driving his go cart along a track such that his position can be given by the equation $f(t)=t^{2}$. Use the limit equation above and refer to the diving board screencast slides to find the Eddie's velocity at time $t=a$
2) Audrey is passing Eddie in his go cart because her position can be given by the equation $f(t)=t^{3}$. Use the limit equation above to find the Audrey's velocity at time $t=a$
Hint: $t^{3}-a^{3}=(t-a)\left(t^{2}+a t+a^{2}\right)$
3) Laura is passing both of them because her position can be given by the equation $f(t)=t^{4}$. Use the limit equation above to find the Laura's velocity at time $t=a$
Hint: $t^{4}-a^{4}=\left(t^{2}-a^{2}\right)\left(t^{2}+a^{2}\right)$
4) If Rocky is passing everyone because her position can be given by the equation $f(t)=t^{5}$, use the pattern of answers to \#1-3 to predict Rocky's velocity at time $t=a$ without using the slope equation.
5) What if Rocky's position equation were $f(t)=t^{6}$ ?
6) $\lim _{x \rightarrow 4} \frac{\sqrt{x}-2}{x-4}$
7) $\lim _{x \rightarrow 2} \frac{\frac{3}{x+4}-\frac{1}{x}}{x-2}$
