(* Quiz 25 | AP Calculus AB | Shubleka *)

In[1]:= `f[x_] := x / (x^2 + 9);`

In[2]:= `Simplify[f'[x]]`

Out[2]= $\dfrac{9 - x^2}{\left(9 + x^2\right)^2}$

In[3]:= `Simplify[f''[x]]`

Out[3]= $\dfrac{2x\left(-27 + x^2\right)}{\left(9 + x^2\right)^3}$

Domain: all reals.
Symmetry: odd
Vertical Asymptote: none
Horizontal Asymptote: y=0
Slant Asymptote: none
x and y-intercept: (0, 0)
Critical numbers of f: x = -3, x =3.
Critical numbers of f ' : x = -Sqrt(27), x = Sqrt(27), x=0
Decreasing on: (- infinity, -3) and (3, infinity)
Increasing on: (-3, 3)
Concave down on: (-infinity, -Sqrt(27)) and (0, Sqrt(27)
Concave up on: (-Sqrt(27), 0) and (Sqrt(27), infinity)
Relative max at x=3. Relative min at x=-3. (Justify using First or Second Derivative Test).
Inflection points at x= -3, 0, 3.

In[6]:= `Plot[{f[x], f[3], f[-3], f[-Sqrt[27]], f[Sqrt[27]]}, {x, -15, 15}]`

Out[6]=