Why are these functions NOT differentiable at the given point?

$y_1 = \sqrt[3]{(x+2)^2} - 1 \qquad x = -2$

$y_2 = \sqrt[3]{x+2} - 1 \qquad x = -2$

$y_3 = \frac{1}{\sqrt[3]{x+2}} - 1 \qquad x = -2$

Why are these functions NOT differentiable at the given point?

$$y_4 = \begin{cases} (x+2)^2 - 1, & x \geq -1 \\ 4 + 2x, & x < -1 \end{cases}$$

$$y_5 = \begin{cases} (x+2)^2 - 1, & x \geq -2 \\ 5 + 3x, & x < 2 \end{cases}$$

$$y_6 = -(x-2)^{-2}$$

For $f(x) = x^4 - 3x^3 + 2x + 1$ **, find the x-value where** ***m = 3***

Find the rate of change when $x = 2$ for the given function

$$f(x) = 3x(3x-4)^2 + (2x-1) + 25$$

Find the derivative.

$$y = \frac{x^2}{\sin x}$$

Find the derivative.

$$y = \left(x^3 + \frac{1}{x^3} \right)\left(x^2 - 3 \right)$$

Find the derivative at the given point using the alternate definition of derivative

$$y = 3x^2 - x + 1 \quad at \quad x = 2$$

Find the derivative

$$f(x) = \frac{x^2 - 4}{\sqrt{x}}$$

If $f(2)=5$ and $f'(2)=-\frac{1}{2}$

Find the equation of the tangent line at $x = 2$

A ball is dropped from 300 feet.
Find the velocity when it hits the ground.

Given $y = \dfrac{x^2 - 1}{x^2 + 1}$ **Find** y'

Given $f(x) = x^2 + 2\tan x$

Find the equation of the tangent line at $x = \frac{\pi}{4}$

Given $f(x) = 3\sqrt{x} + 2x^2$

Find $f''(4)$

Given $f(x) = 5\sec x \tan x$

Find $f'(x)$

Given $v_0 = -50\,ft/\sec$

$s_0 = 400\,ft$

Find the velocity after the object has fallen 150 feet.

Given the function $y = x^3 + x$.
Find the points on the curve that have a tangent line with a slope of 3