Finding Slopes of Tangent Lines
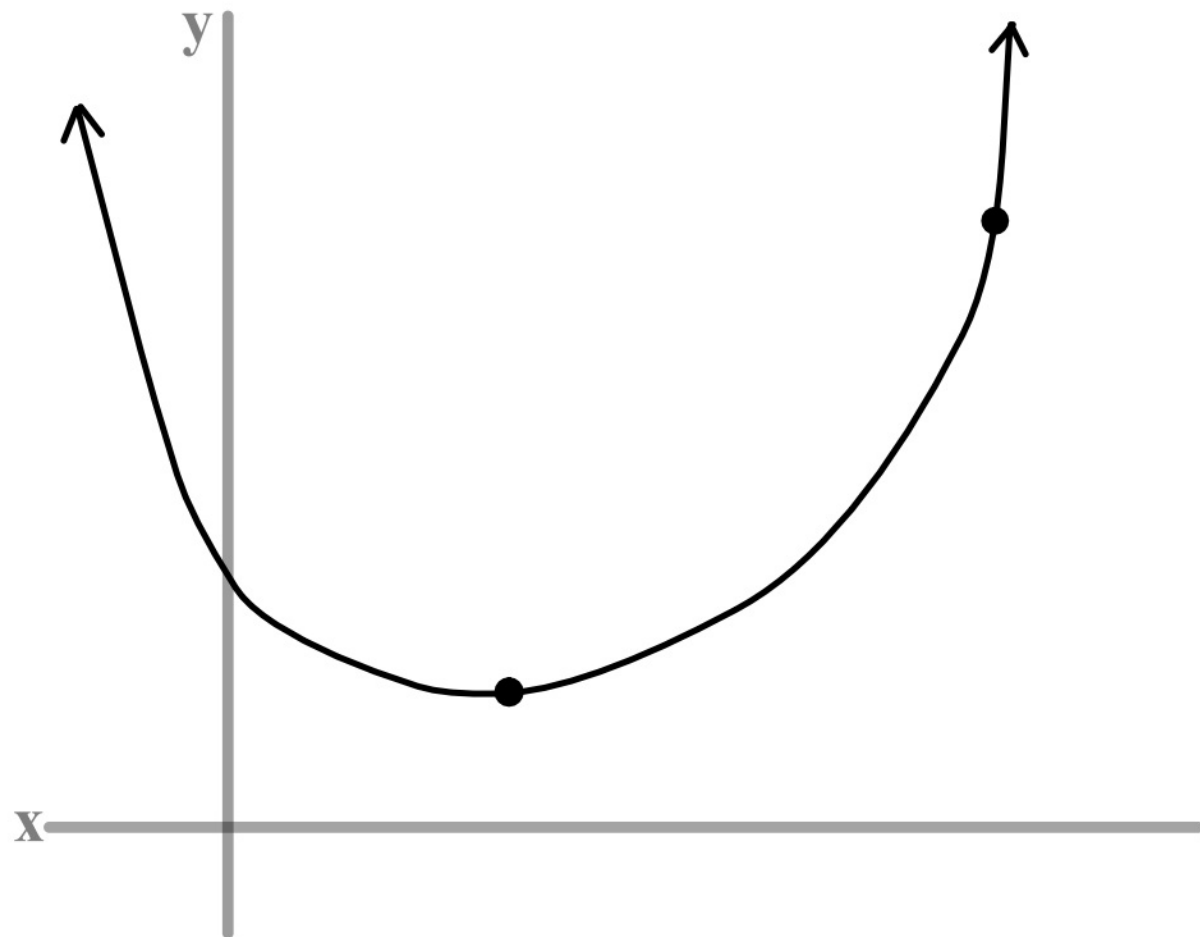
What is a Derivative?????

Is...	Is not...

Notation

What is a Derivative?????

Notation That Means Derivative

- $f'(x)$

- dy/dx

- d/dx

- y'

- $D_x[y]$

- $\displaystyle\lim_{\Delta x \to 0} \frac{f(x+\Delta x) - f(x)}{\Delta x}$

Notation

Find the derivative of $f(x) = 3x + 4$

Find the derivative of $h(x) = 4 - x^3$

Find the derivative of $y = x^3 + x^2$

Find the slope of the tangent line at the point (6,1) of $f(x) = \sqrt{x - 5}$

1 2 3 4 5 6

Find the equation of the tangent line at (2,1/4) of the following function:

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

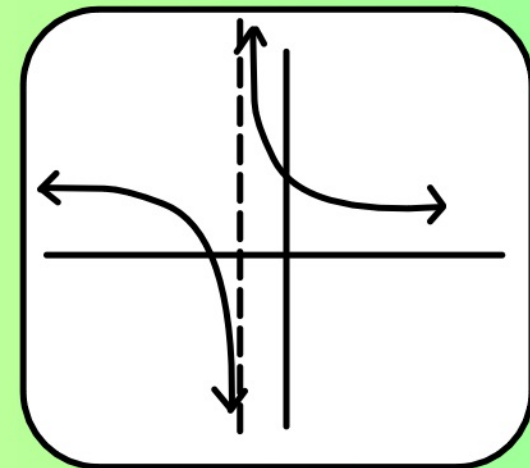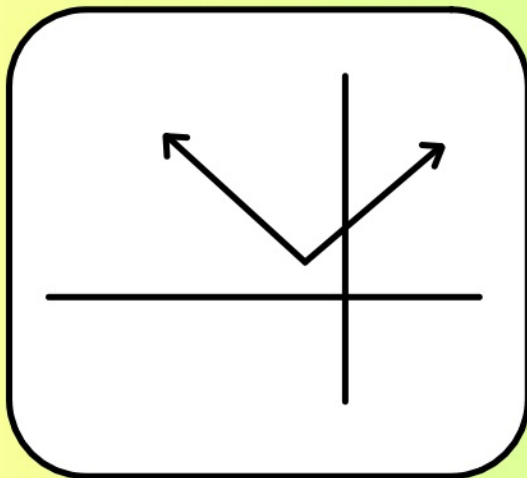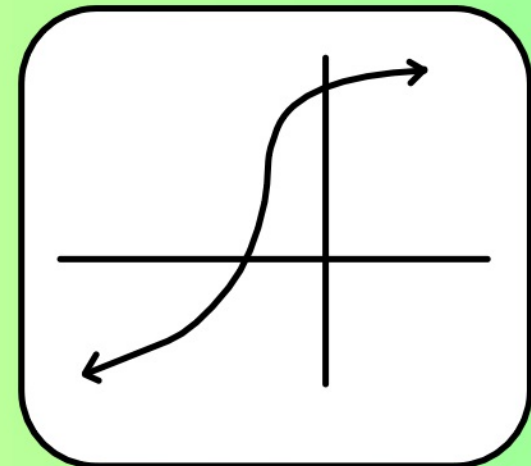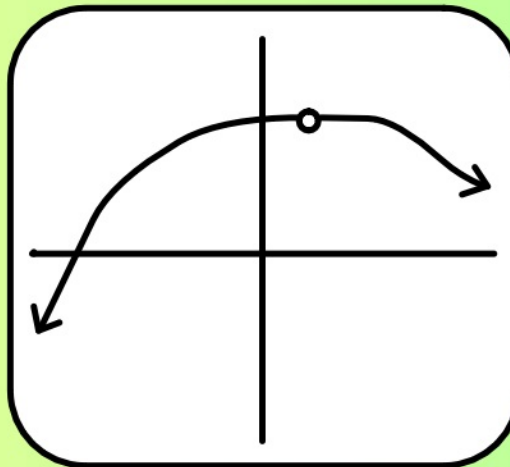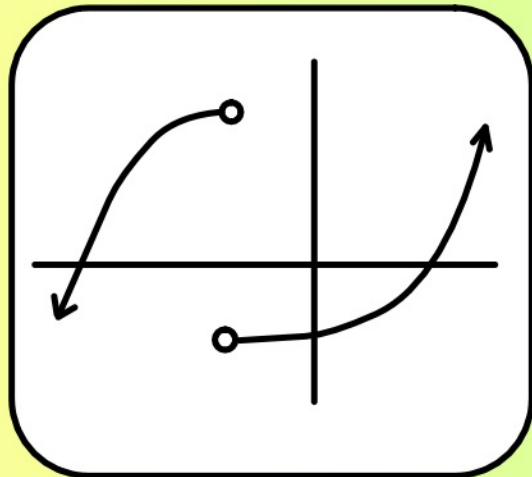Find the slope of the tangent line of $f(x) = |x - 6|$ when $x = 2$.
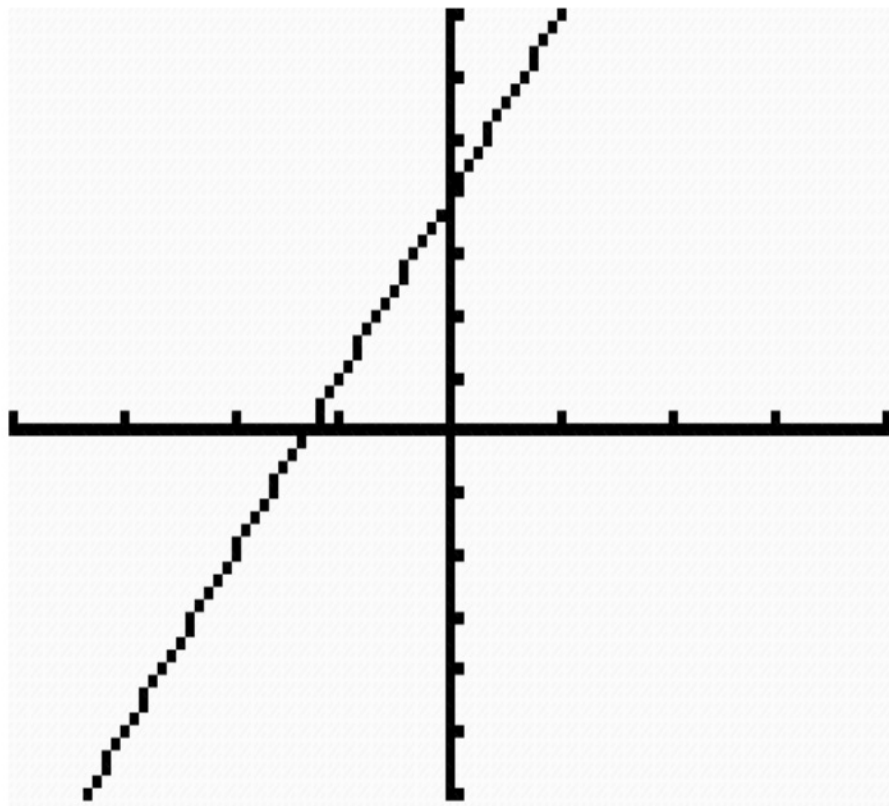
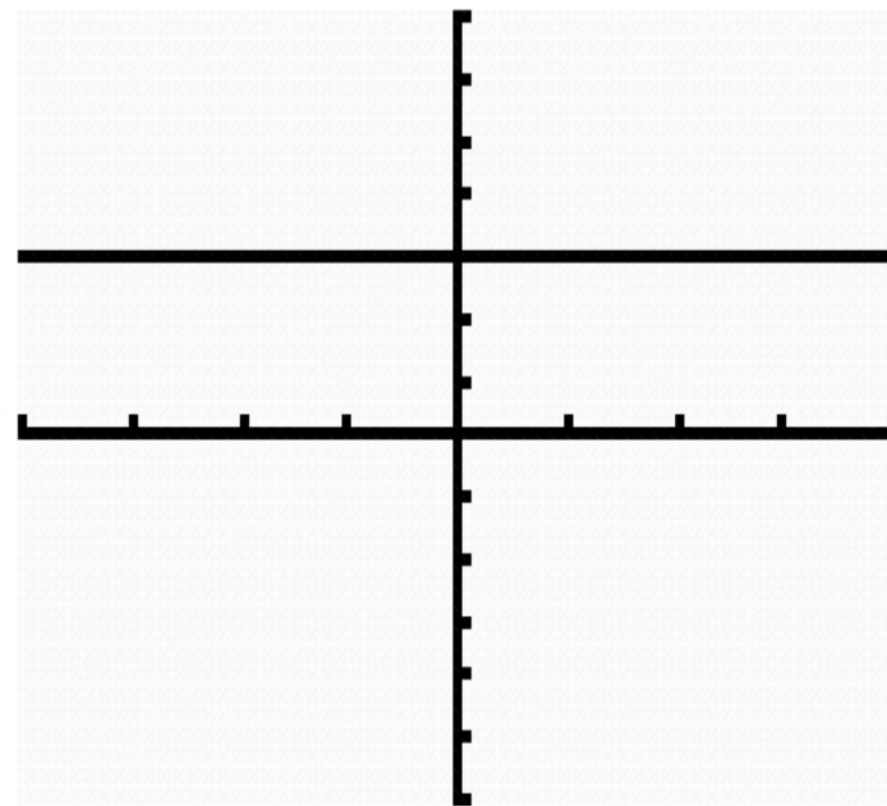# When is a function not differentiable?????????
(When is there no tangent line)
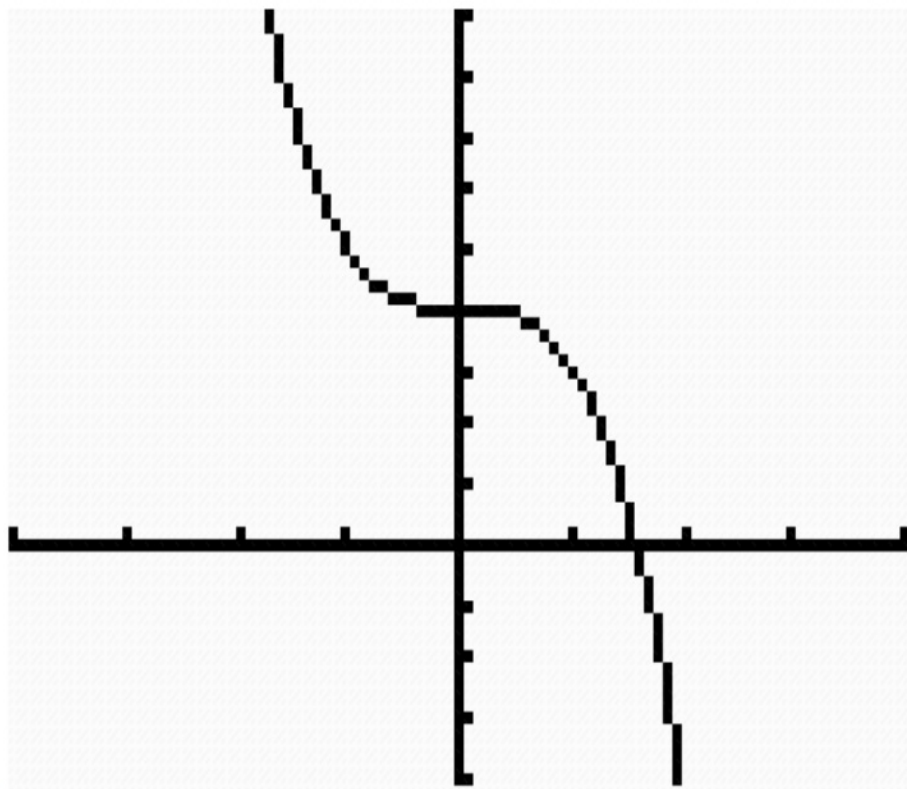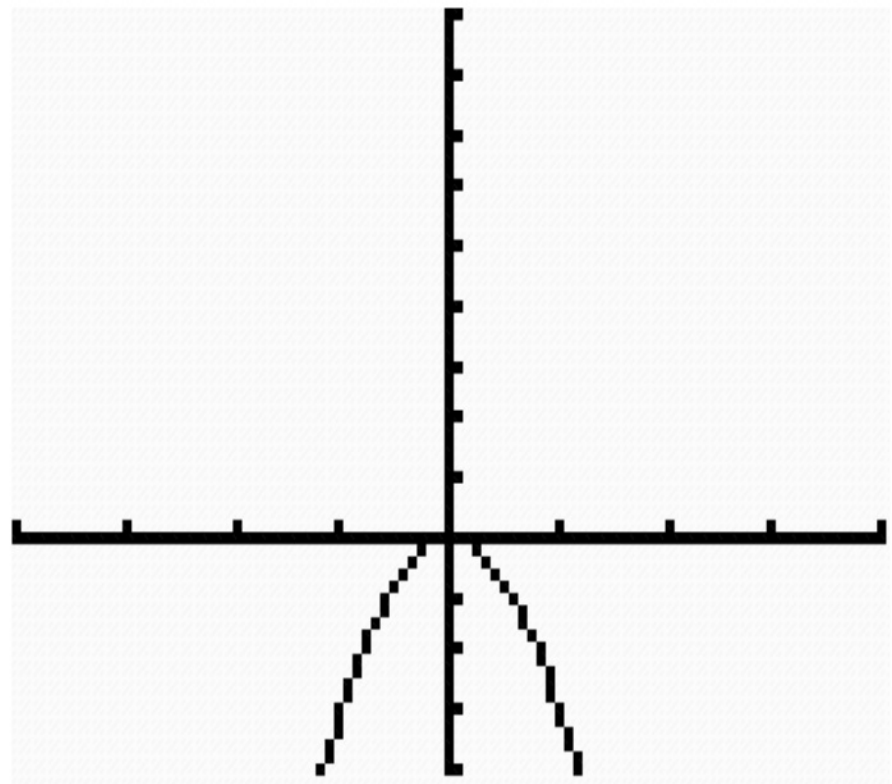
$$f(x) = 3x + 4$$

$$f'(x) = 3$$

1 ● 2 ● 3 ● 4 ● 5 6 7 8 9

$$f(x) = 4 - x^3$$

$$f'(x) = -3x^2$$

$$y = x^3 + x^2$$
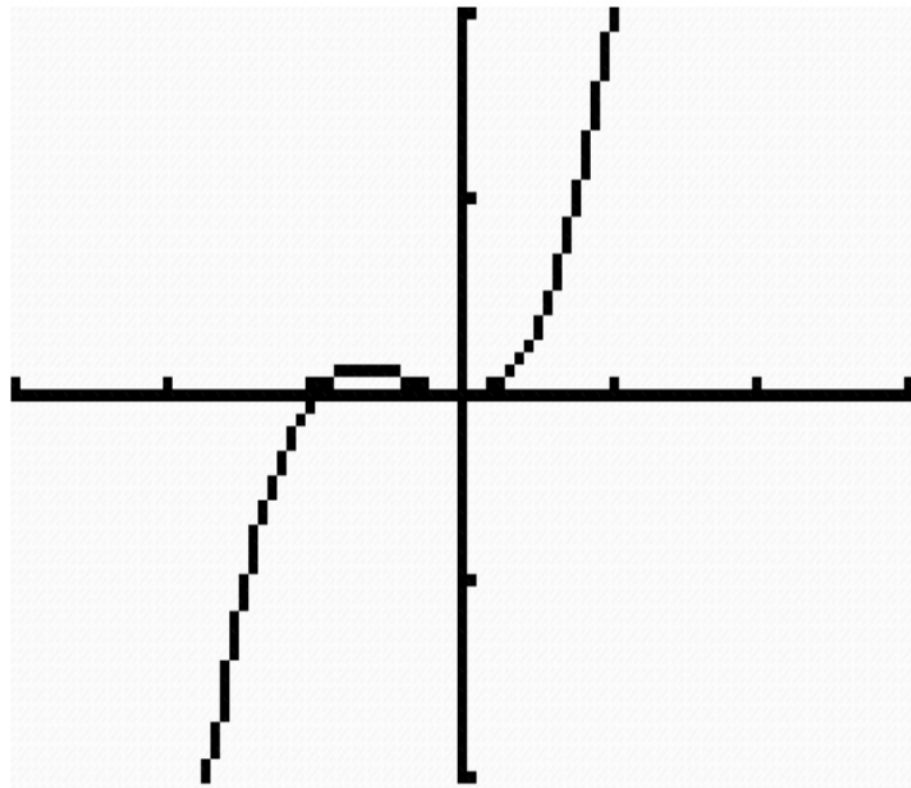
$$y' = 3x^2 + 2x$$
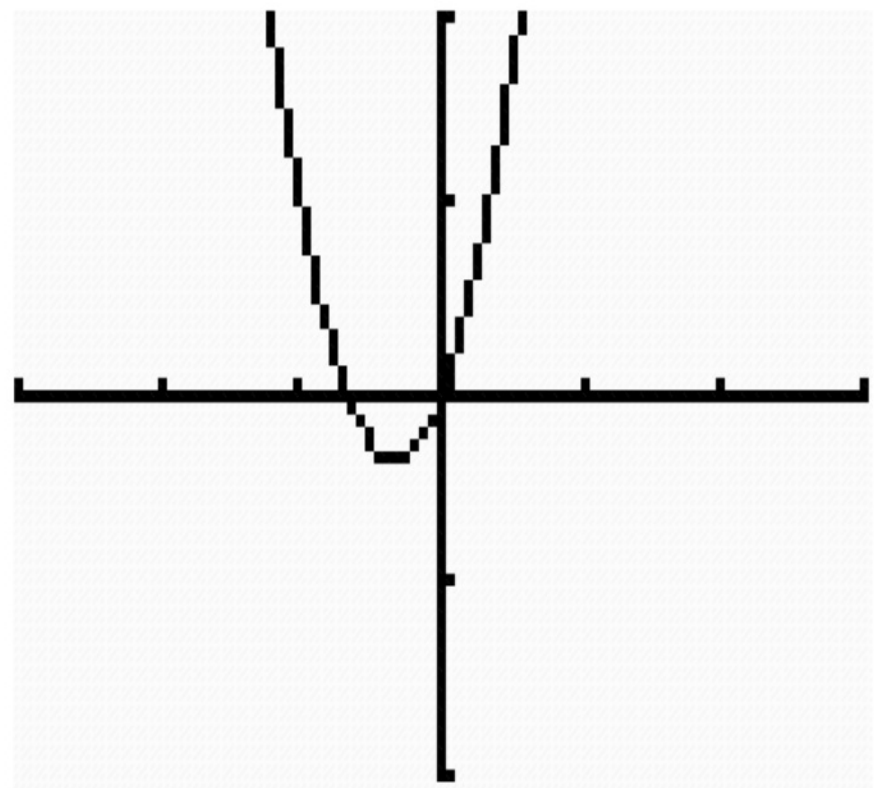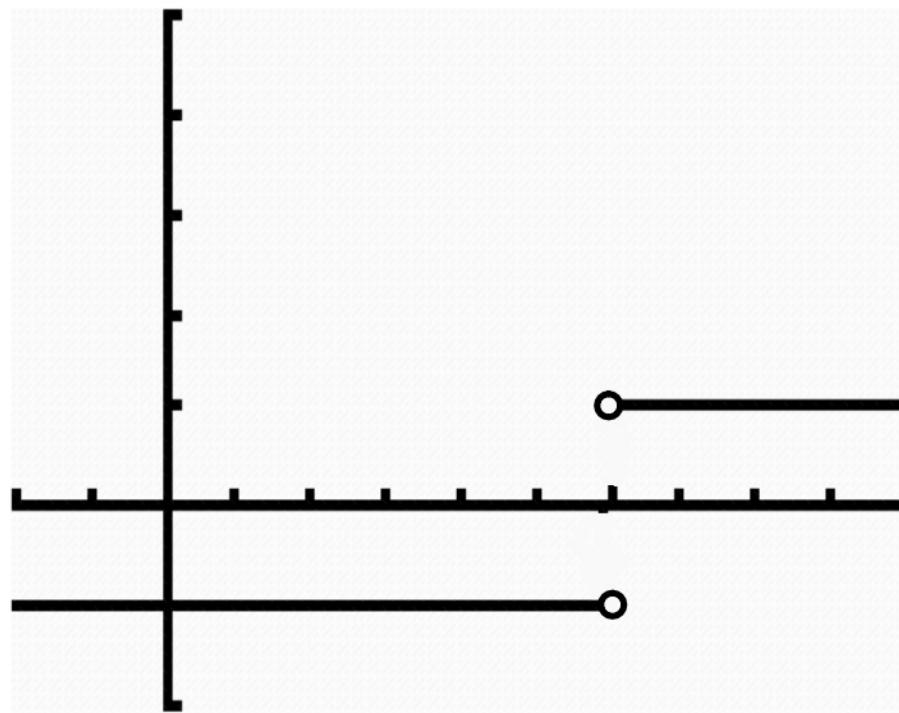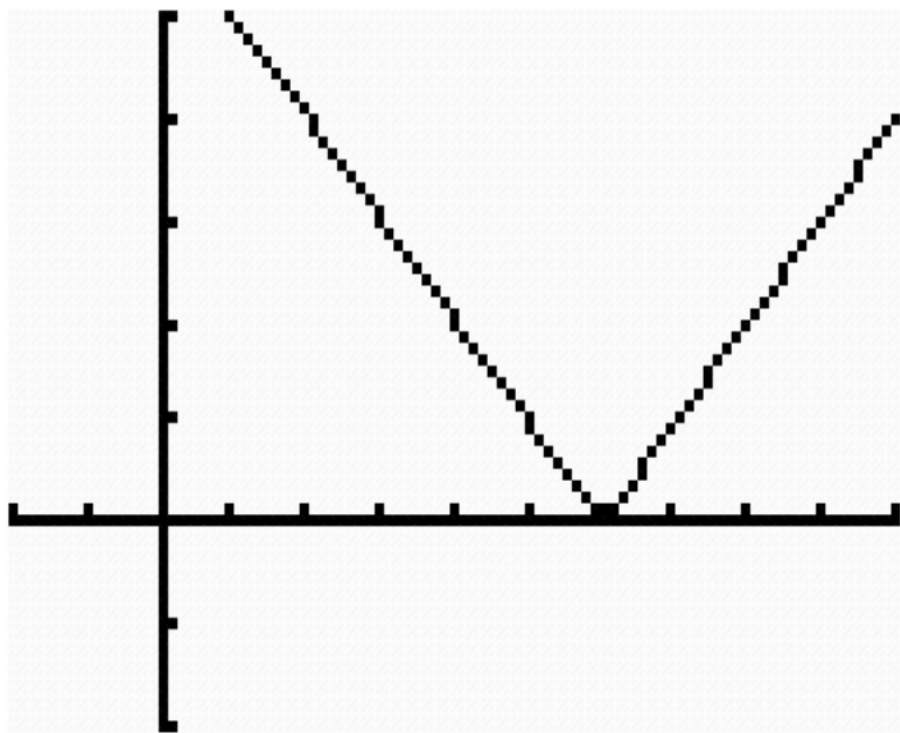
$$f(x) = |\ x - 6\ |$$

$$f'(x) = \begin{cases} -1, & x < 6 \\ 1, & x > 6 \end{cases}$$

Give a rough sketch of the derivative graph of:

$$y = \left| x^2 - 9 \right|$$
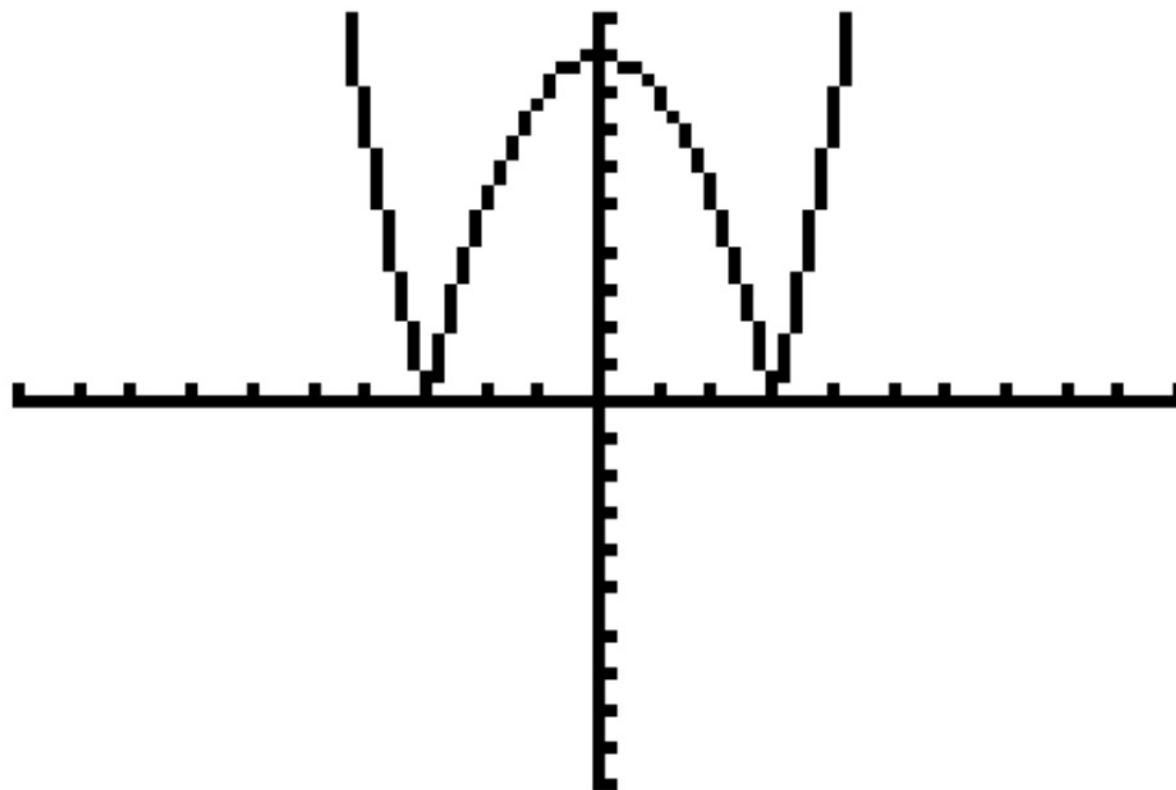
① ● ② ● ③ ● ④ ● ⑤ ⑥ ⑦ ⑧ ⑨
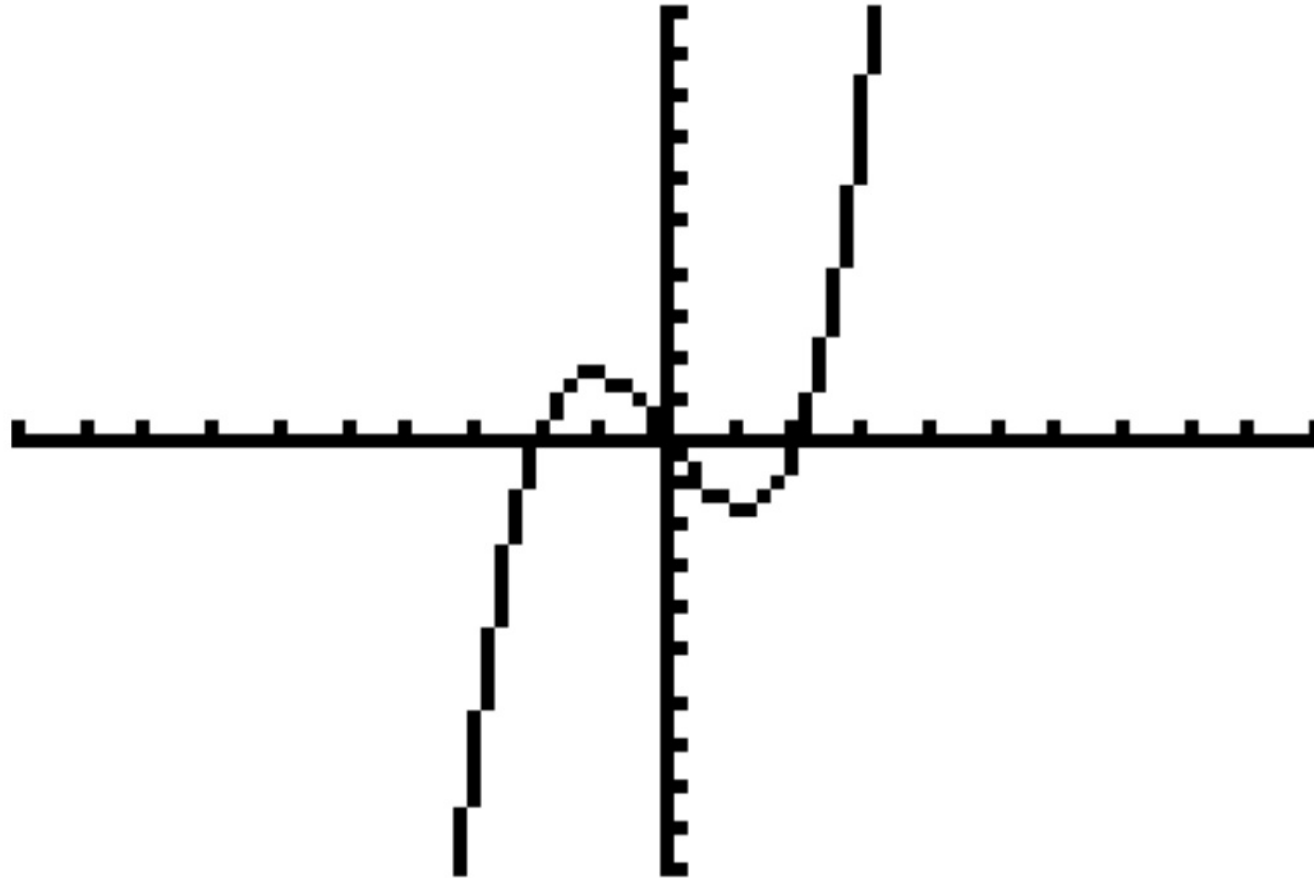
Give a rough sketch of the derivative of:
$y = .5x3 - 2x$

Identify a function with the following characteristics:

$f(0) = -7$

$f'(x) = -5$
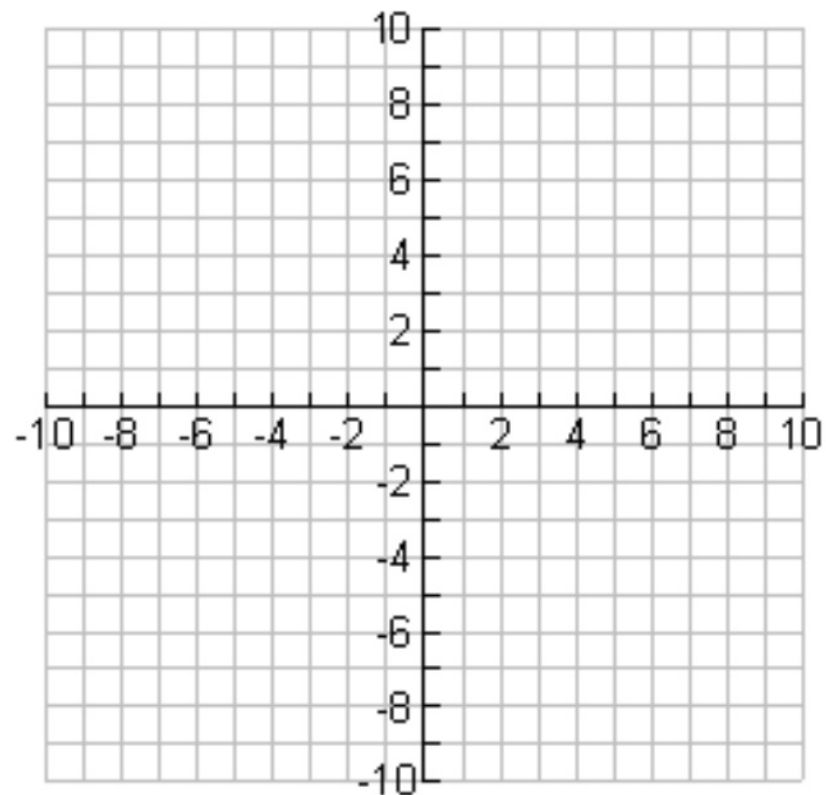
Identify a function with the following characteristics:

$f(7) = 0$

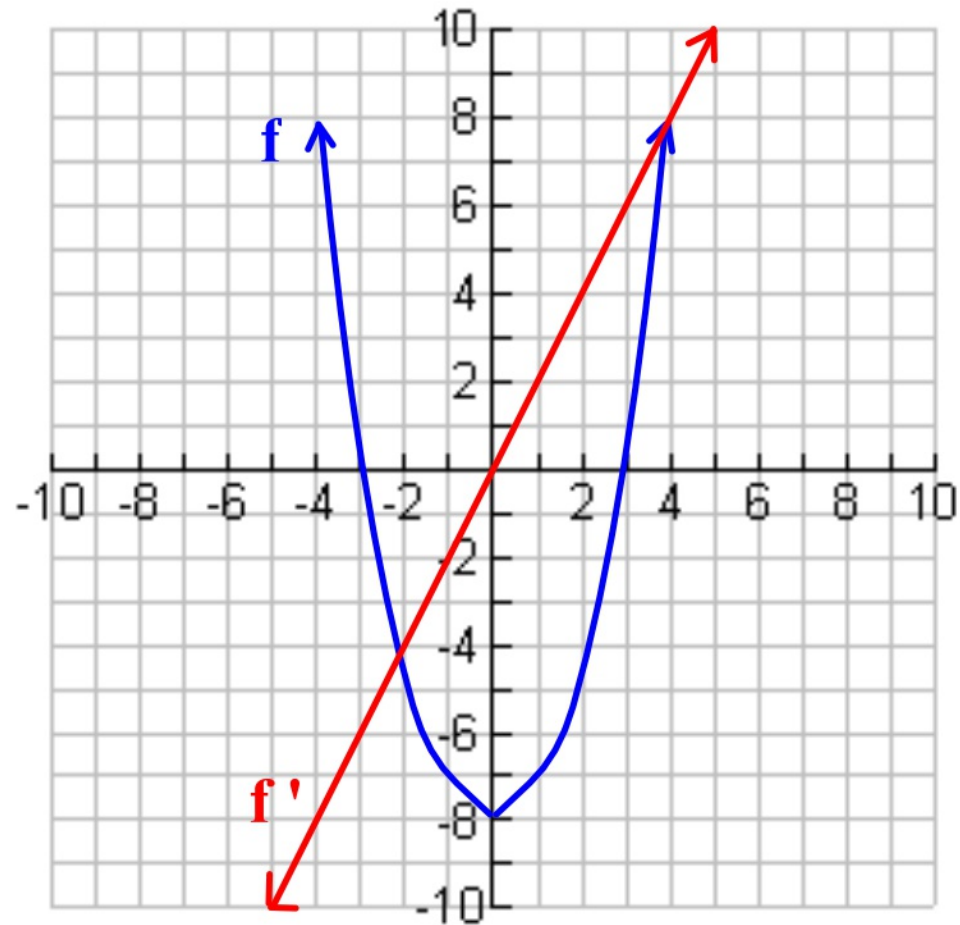$f'(x) = -2$ for $x < 7$

$f'(x) = 2$ for $x > 7$
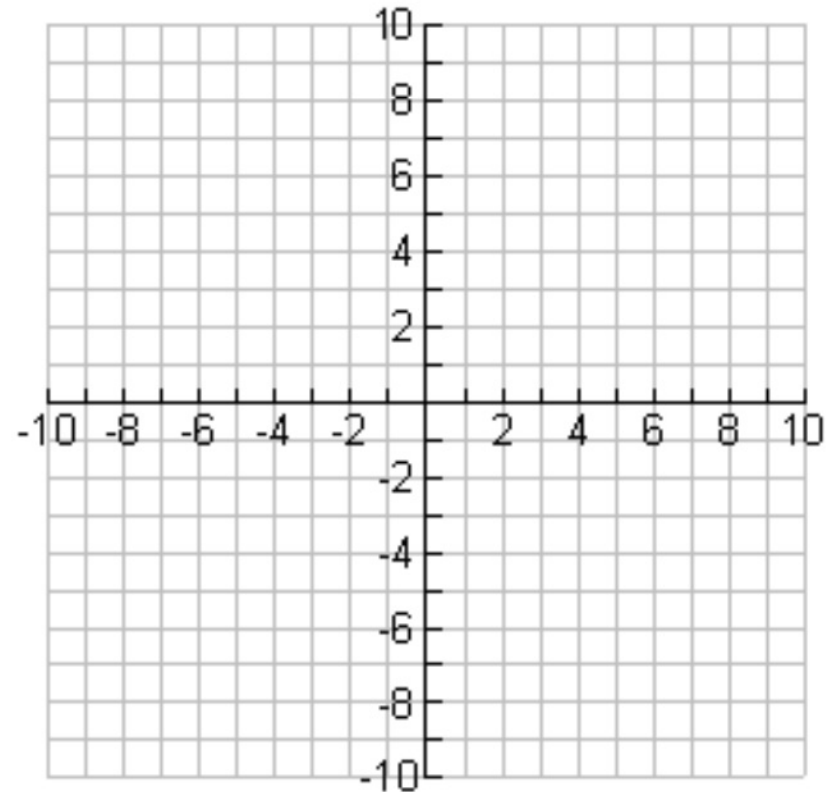
1. What is the slope of the tangent line of f at x = -4?

2. What does the root of f ' have to do with the graph of f?

3. What is the value of f '(2)? What can you conclude about f knowing this?

Homework:
p. 103# 5-29odd, 37-40, 43-48, 53-56, 59, 81-86