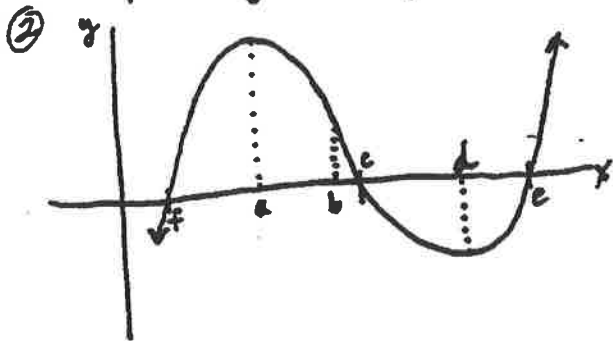


Calculus - Graphing using 1st + 2nd derivatives

① Graph the general shape of the function given $y' = x^2 - 8x - 9$



where is:

- | | |
|------------------|----------------------------------|
| a.) $f'(x) = 0$ | f.) $f''(x) < 0$ |
| b.) $f(x) = 0$ | g.) $f'(x) > 0$ |
| c.) $f''(x) = 0$ | h.) $f''(x) > 0$ |
| d.) $f(x) < 0$ | i.) $f'(x) > 0$ and $f''(x) < 0$ |
| e.) $f'(x) < 0$ | j.) $f'(x) < 0$ and $f''(x) > 0$ |

③ Draw a function with the following properties:

$f(-2) = -4$ $f'(x) = 0$ when $x = -2, 5$

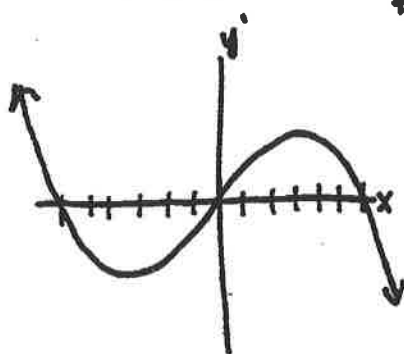
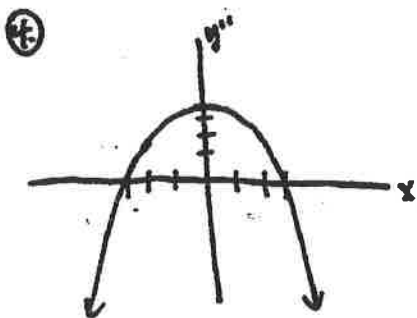
$f(5) = 10$ $f'(x) < 0$ when $x < -2$ and $x > 5$

$f(1.5) = 3$ $f'(x) > 0$ when $-2 < x < 5$

$f''(x) = 0$ when $x = 1.5$

$f''(x) < 0$ when $x > 1.5$

$f''(x) > 0$ when $x < 1.5$



$f(3) = -2$

$f(-3) = -2$

$f(-6) = 4$

$f(0) = -8$

$f(6) = 4$

Sketch $f(x)$

⑤ Draw a function with the following properties:

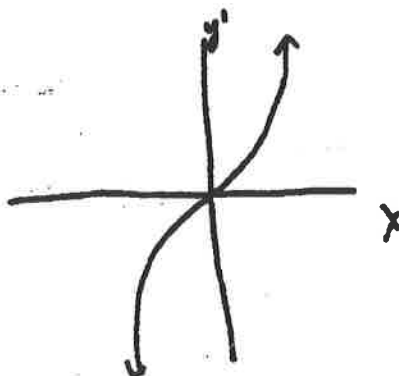
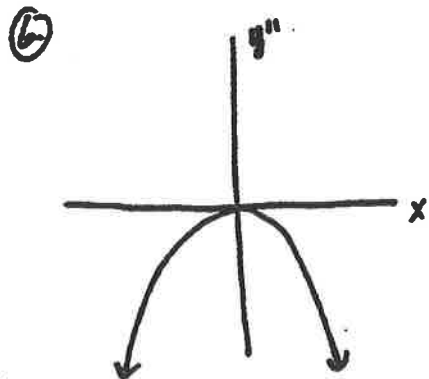
$f(3) = 4$

$f''(x) = 0$ when $x = 3$

$f'(x) > 0$ for all $x \in \mathbb{R}$

$f''(x) > 0$ when $x < 3$

$f''(x) < 0$ when $x > 3$



$f(0) = 0$

Sketch $f(x)$

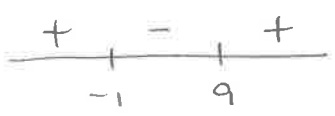
1.

$$y' = x^2 - 8x - 9$$

$$0 = (x - 9)(x + 1)$$

$$x = 9$$

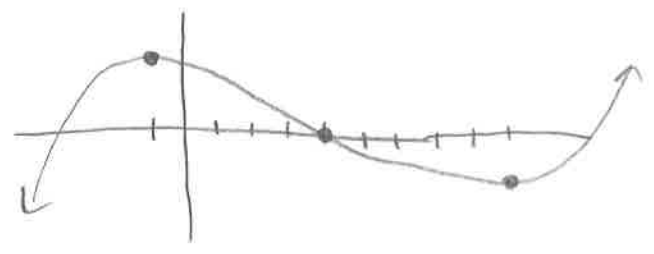
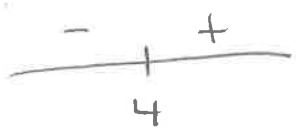
$$x = -1$$



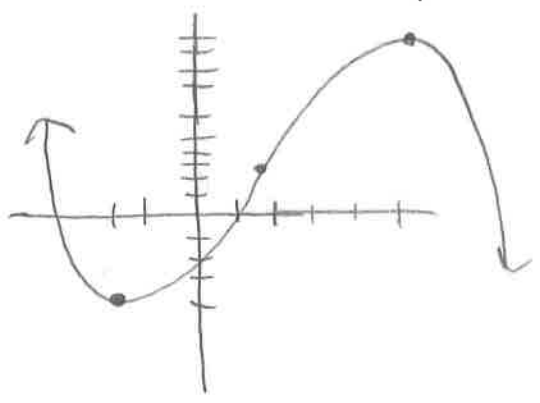
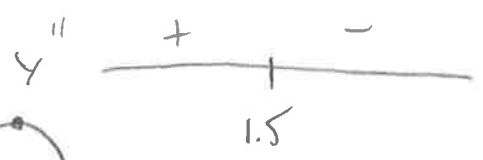
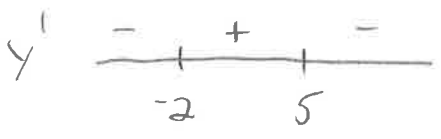
$$y'' = 2x - 8$$

$$0 = 2x - 8$$

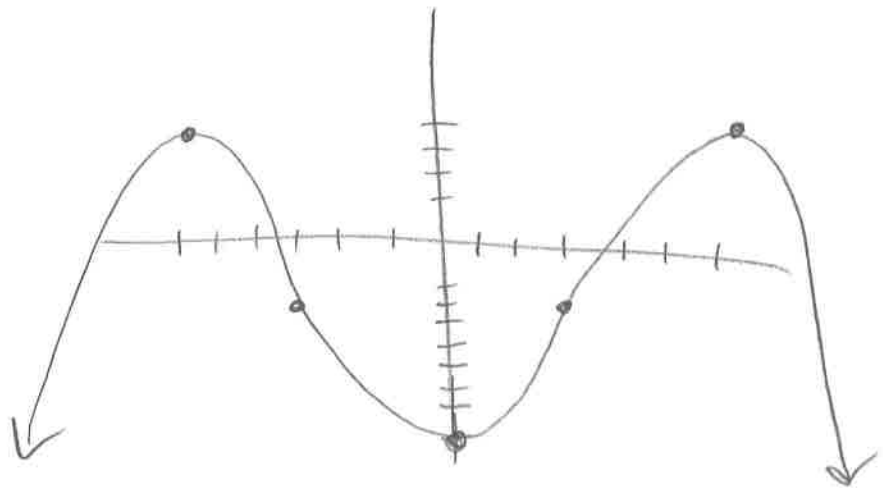
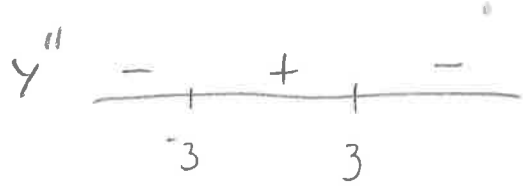
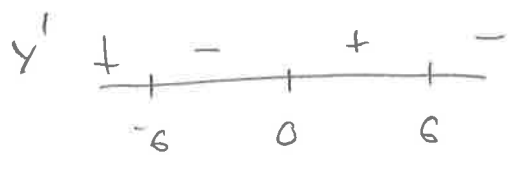
$$x = 4$$



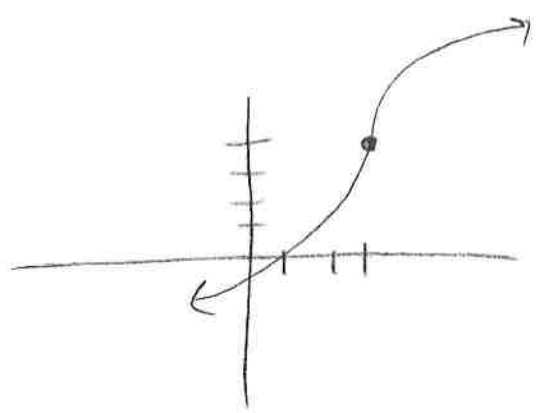
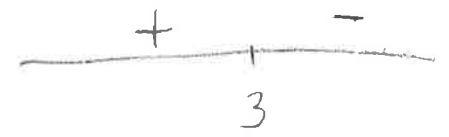
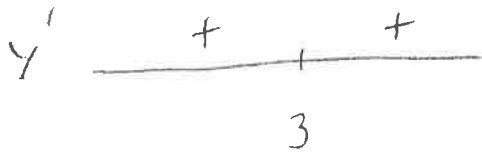
3.



4.



5.



6.

