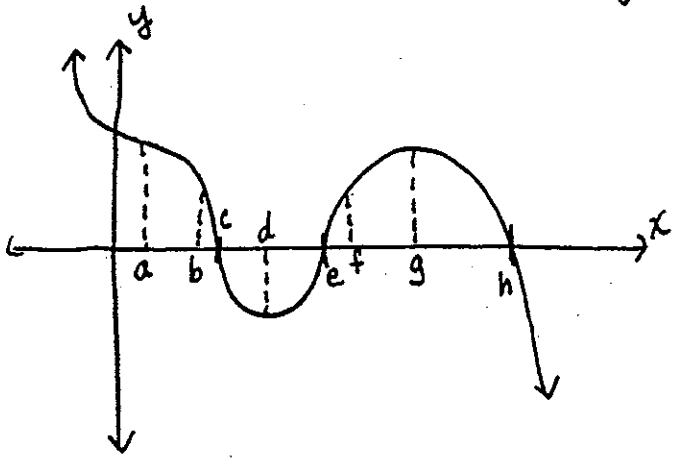
Calculus - Graphing (1st & 2nd derivatives)

① Graph the general shape of the function given $y' = x^2 - 6x + 8$

(a)



Where is:

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

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③ Draw a function with the following properties:

$f(-3) = -4$
$f(-2) = -1$
$f(-1) = 2$

$f'(x) = 0$ when $x = -1, -3$
$f'(x) < 0$ when $x < -3$ + $x > -1$
$f'(x) > 0$ when $-3 < x < -1$

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

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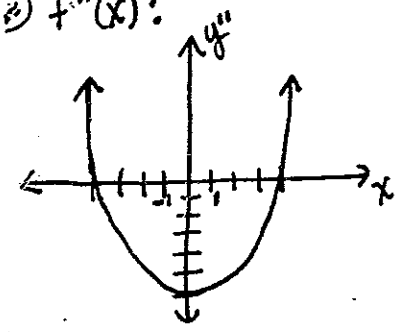
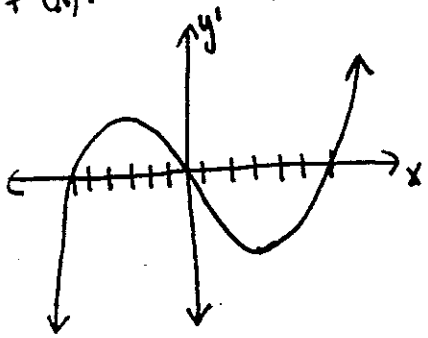
④ $f''(x)$:



$f'(x)$:



$f(-6) = -1$
$f(-4) = 2$
$f(0) = 8$
$f(4) = 2$
$f(6) = -1$

Sketch $f(x)$

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⑤ Draw a function with the following properties:

$f(-5) = 0$
$f'(x) < 0$ for all $x \in \mathbb{R}$

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

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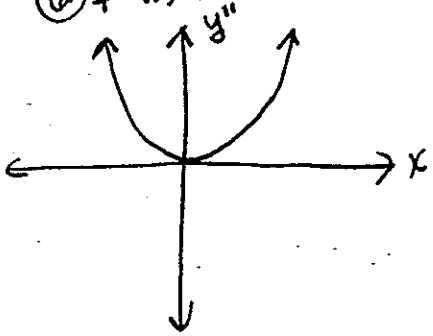
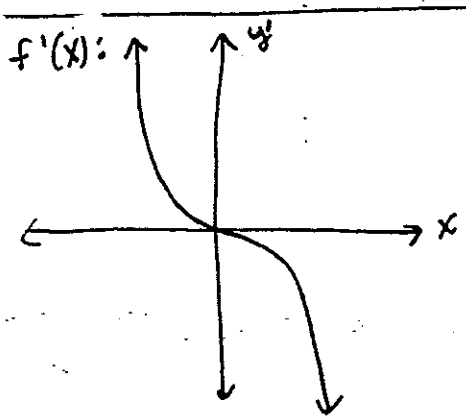
⑥ $f''(x)$:



$f'(x)$:



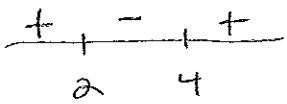
$f(0) = -3$

1.

$y' = x^2 - 6x + 8$

$0 = (x-4)(x-2)$

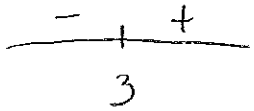
$x = 2, 4$

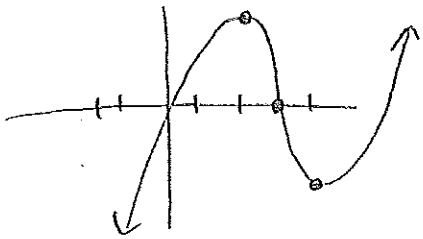


$y'' = 2x - 6$

$0 = 2x - 6$

$x = 3$





2.

a.) a, g

b.) c, e, h

c.) a, b, f

d.) $[b, c] \cup [h, \infty)$

e.) $(-\infty, a] \cup [g, \infty)$

f.) $(a, b)\ (f, \infty)$

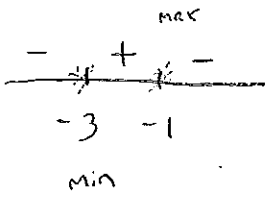
g.) $[a, g]$

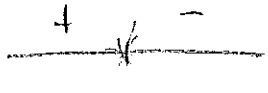
h.) $(-\infty, a)\ (b, f)$

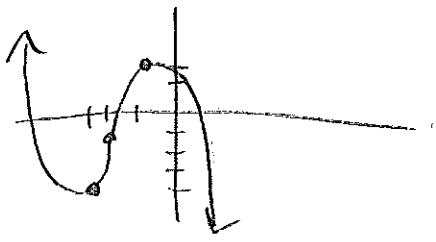
i.) (f, g)

j.) $(-\infty, a)\ (b, d)$

3.







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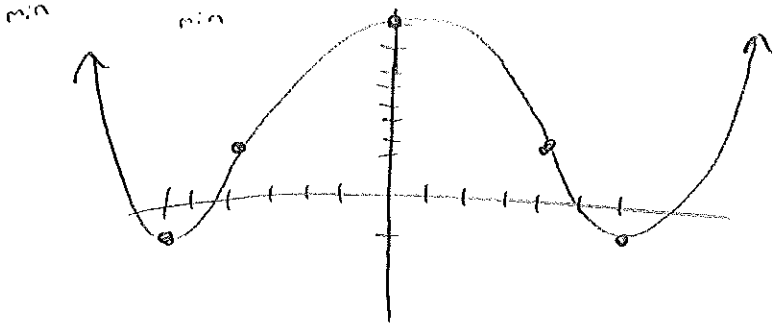

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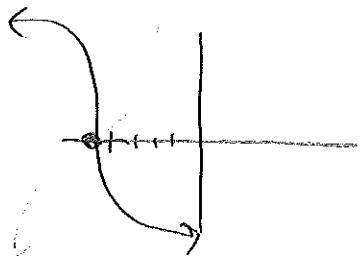

6.