

$$x^2 \cdot x^3 = x^5$$

4.3f  $-\sqrt{8}, \sqrt{8}$

⑤  $y = x \sqrt{8-x^2}$

$$y' = (8-x^2)^{1/2} + \frac{1}{2}(8-x^2)^{-1/2}[-2x]x = 0 \leftarrow \textcircled{\sqrt{8} \approx 2.8}$$

~~$$(8-x^2)^{-1/2} [1 + (8-x^2)]$$~~

$$(8-x^2)^{-1/2} [(8-x^2)' + -x^2] = 0 \leftarrow$$

$$(8-x^2)^{-1/2} = 0$$

$$8 - 2x^2 = 0$$

$$\frac{1}{(8-x^2)^{1/2}} = 0$$

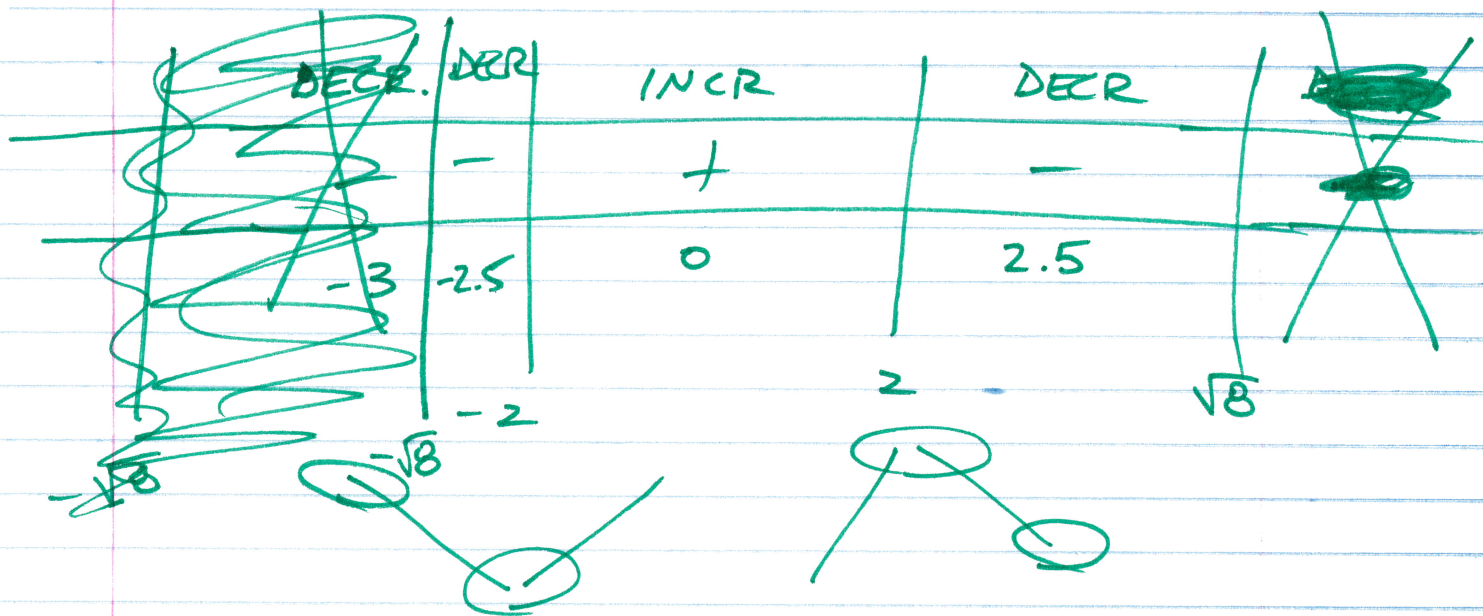
$$8 = 2x^2$$

$$(8-x^2)^{-1/2} (8-2x^2)$$

$$4 = x^2$$

$$\frac{1}{\sqrt{8-x^2}} +$$

$$\pm 2 = x$$

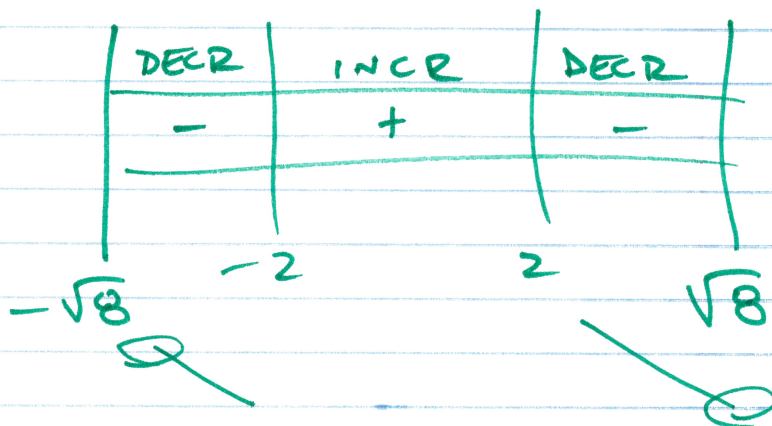


$$f(-\sqrt{8}) =$$

$$f(-2) =$$

$$f(2) =$$

$$f(\sqrt{8}) =$$



4.3

$$\textcircled{19} \quad y = \frac{x^3 - 2x^2 + x - 1}{x - 2} \quad \begin{matrix} f \\ g \end{matrix}$$

$$y' = \frac{(3x^2 - 4x + 1)(x - 2) - (x^3 - 2x^2 + x - 1)}{(x - 2)^2}$$

$$= \frac{3x^3 - 4x^2 + x - 6x^2 + 8x - 2 - x^3 + 2x^2 - x + 1}{(x - 2)^2}$$

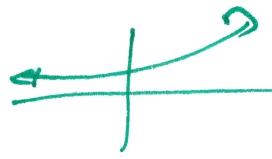
$$= \frac{2x^3 - 8x^2 + 8x - 1}{(x - 2)^2} \quad \begin{matrix} f \\ g \end{matrix}$$

$$y'' = \frac{(6x^2 - 16x + 8)(x - 2)^2 - 2(x - 2)(2x^3 - 8x^2 + 8x - 1)}{(x - 2)^4}$$

$x \neq 2$

$x = 1, 2$

UP	Down	UP
+	-	-
0	1.5	3
	1	2



4.3 f z

(37)

$$y = x e^x$$

$$y' = e^x + x e^x$$

$$y'' = e^x + e^x + x e^x$$

$$= 2e^x + x e^x$$

$$e^x + x e^x = 0$$

$$e^x (1+x) = 0$$

$$e^x = 0$$

x

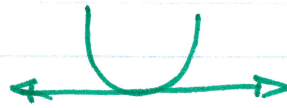
$$1+x = 0$$

$$x = -1$$

$$y''(-1) = 2e^{-1} - e^{-1}$$

$$= \frac{2}{e} - \frac{1}{e}$$

$$= \frac{1}{e}$$



MINIMUM

$$\frac{d}{dx} 2^x = 2^x \ln 2$$

4.3

⑪  $y = \begin{cases} 2x, & x < 1 \\ 2^{-x^2}, & x \geq 1 \end{cases}$

NONE	DOWN
0	-
	1

$$y' = \begin{cases} 2, & x < 1 \\ -2x, & x > 1 \end{cases}$$

$$y'' = \begin{cases} 0, & x < 1 \\ -2, & x > 1 \end{cases}$$

⑫  $y = x \sqrt{8-x^2} = x(8-x^2)^{1/2}$   $(-\sqrt{8}, \sqrt{8})$

$$y' = (8-x^2)^{1/2} + \frac{1}{2}(8-x^2)^{-1/2} [-2x] \cdot x$$

$$= (8-x^2)^{1/2} - x^2(8-x^2)^{-1/2}$$

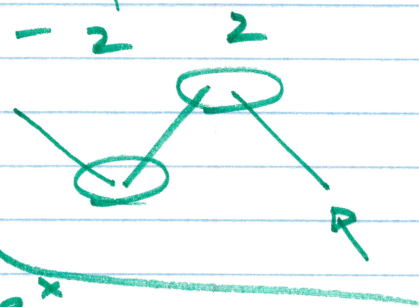
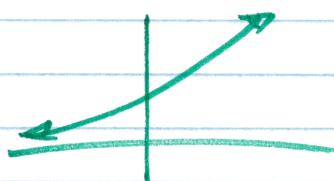
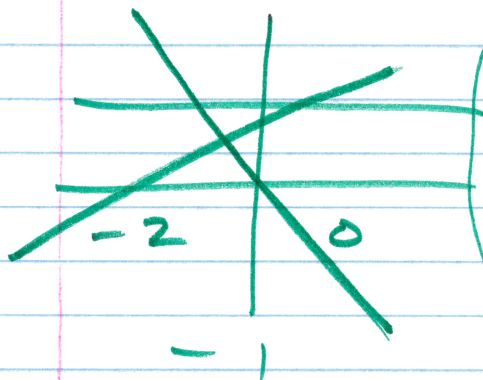
DECR	INCR	DECR
-	+	-
	-2	2

⑬  $y = x e^{x^2}$

$$y' = e^x + x e^x = 0$$

$$e^x(1+x) = 0$$

~~$x = -1$~~



$$y'' = e^x + e^x + x e^x$$

$$y'' = 2e^x + x e^x$$

$$= e^x(2+x) = 0$$

CT  $x = -2$

DOWN	UP
-	+
-3	-1

$$y(-2) = -2e^{-2}$$

$(-2, -2e^{-2})$

$x = -2$

4.3  
(17)  $y = x^{1/3}(x-4)$

$$y = x^{4/3} - 4x^{1/3}$$

$$y' = \frac{4}{3}x^{1/3} - 4/3x^{-2/3}$$

$$y'' = \frac{4}{9}x^{-2/3} + \frac{8}{9}x^{-5/3} = 0$$

$$x = -2$$

CT

UP	DOWN	UP
+	-	+

$$-2 \quad 0$$
$$x \neq 0$$

$$\frac{4}{9x^{2/3}} + \frac{8}{9x^{5/3}}$$

$$y(0) = 0^{1/3}(0-4) = 0$$

$$(0, 0)$$

$$y(-2) = -2^{1/3}(-2-4) = 6 \cdot 2^{1/3}$$

$$(-2, 6 \cdot 2^{1/3})$$