- EXTRA PAGE

$$\lim_{x \to 6^+} f(x) = \lim_{x \to 6^-} f(x) = 0$$

& hence $\lim_{x \to 6} f(x)$ exists.

$f(x)$ is also cont. at $x = 6$ as $f(6) = 0$.

But $f(x)$ is not diff. at $x = 6$ due to the sharp corner in the curve at $x = 6$.

Also $\lim_{h \to 0} \left. \frac{f(x+h) - f(x)}{h} \right|_{x=6}$

$= \lim_{h \to 0} \frac{f(h+6) - f(6)}{h}$

does not exist (we have seen a similar example in class)

• EXTRA PAGE

$\frac{6}{}$

(2) domain of $3\sin^{-1}(3x+1)+3$ is $[-2/3, 0]$ just as for part (1).

The range is obtained as follows

$-\frac{\pi}{2} \leq \sin^{-1}(3x+1) \leq \frac{\pi}{2}$ from (1)

Let $y = 3\sin^{-1}(3x+1)+3$

$\sin^{-1}(3x+1) = \frac{y-3}{3}$

$\therefore -\frac{\pi}{2} \leq \frac{y}{3} - 1 \leq \frac{\pi}{2}$

$\therefore 1-\frac{\pi}{2} \leq y/3 \leq \pi/2 + 1$

$\therefore 3-\frac{3\pi}{2} \leq y \leq \frac{3\pi}{2}+3.$

Range is $\left[3-\frac{3\pi}{2}, \frac{3\pi}{2}+3\right]$

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$$\lim_{x \to 2.3^-} f(x) = \lim_{x \to 2.3^-} \lfloor x \rfloor + \lfloor -x \rfloor$$

$$= 2 + (-3) = -1$$

$$\lim_{x \to 2.3^+} f(x) = \lim_{x \to 2.3^+} \lfloor x \rfloor + \lfloor -x \rfloor$$

$$= 2 + (-3) = -1$$

Hence $\lim_{x \to 2.3} f(x)$ exists.

$$f(2.3) = \lfloor 2.3 \rfloor + \lfloor -2.3 \rfloor$$

$$= 2 - 3 = -1.$$

Hence $f(x)$ is cont at $x = 2.3$.

Q5 <u>Contd</u>

$4 + 2\tan^{-1}|x/3|$