10. $f(x) = \frac{x^2+1}{x+2}$ $\begin{matrix} P \\ Q \end{matrix}$

① $P' = 2x \quad Q' = 1$

$\frac{P'Q - PQ'}{Q^2}$

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

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

$= \boxed{\frac{x^2+4x-1}{(x+2)^2}}$

② $x^2+4x-1=0 \qquad (x+2)^2=0$

$a=1 \quad b=4 \quad c=-1 \qquad x+2=0$

$x=-2$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$x = \frac{-4 \pm \sqrt{4^2-4(1)(-1)}}{2(1)}$

$x = \frac{-4 \pm \sqrt{16+4}}{2}$

$x = \frac{-4 \pm \sqrt{20}}{2}$

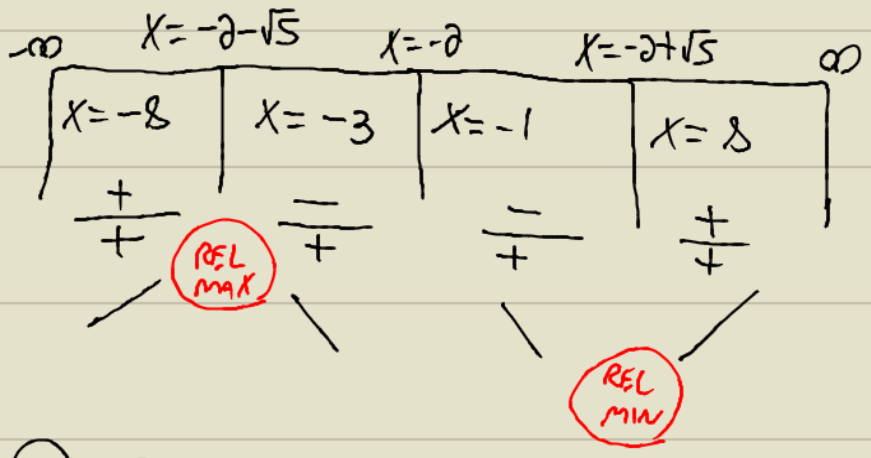
$x = \frac{-4 \pm \sqrt{2 \cdot 2 \cdot 5}}{2}$

$x = \frac{-4 \pm 2\sqrt{5}}{2}$

$x = \frac{-2 \pm 1\sqrt{5}}{1}$

$x = -2 \pm \sqrt{5}$

③ $x = -2 \pm \sqrt{5} \qquad x = -2$



④ REL MAX : $x = -2-\sqrt{5}$

$y = \frac{x^2+1}{x+2} = \frac{(-2-\sqrt{5})^2+1}{-2-\sqrt{5}+2}$

$= \frac{(-2-\sqrt{5})(-2-\sqrt{5})+1}{-\sqrt{5}}$

$= \frac{4+2\sqrt{5}+2\sqrt{5}+5+1}{-\sqrt{5}}$

$= \frac{10+4\sqrt{5}}{-\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$

$= \frac{10\sqrt{5}+4(5)}{-5}$

$= -2\sqrt{5}-4$

REL MAX $(-2-\sqrt{5}, -2\sqrt{5}-4)$

REL MIN : $x = -2+\sqrt{5}$

$y = \frac{x^2+1}{x+2}$

$y = \frac{(-2+\sqrt{5})^2+1}{-2+\sqrt{5}+2}$

$= \frac{4-4\sqrt{5}+5+1}{\sqrt{5}}$

$= \frac{10-4\sqrt{5}}{\sqrt{5}}$

$= \frac{10\sqrt{5}-20}{5}$

$= 2\sqrt{5}-4$

REL MIN $(-2+\sqrt{5}, 2\sqrt{5}-4)$