2. $y = \frac{x^2+9}{9-x^2}$ $\quad P = x^2+9 \quad P' = 2x$ $\quad Q = 9-x^2 \quad Q' = -2x$

① $\frac{P'Q - PQ'}{Q^2}$

$$y' = \frac{2x(9-x^2) - (x^2+9)(-2x)}{(9-x^2)^2}$$

$$= \frac{2x[9-x^2+x^2+9]}{(9-x^2)^2}$$

$$= \frac{2x(18)}{(9-x^2)^2}$$

$$y' = \frac{36x}{(9-x^2)^2} \quad \begin{matrix} P \\ Q \end{matrix}$$

$P = 36x \quad Q = (9-x^2)^2$

$P' = 36 \quad Q' = 2(9-x^2)^1 \cdot \frac{d}{dx}(9-x^2)$

$Q' = 2(9-x^2)(-2x)$

$= -4x(9-x^2)$

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

$$y'' = \frac{36(9-x^2)^2 - 36x(-4x(9-x^2))}{[(9-x^2)^2]^2}$$

$$= \frac{36(9-x^2)^2 + 36 \cdot 4x^2(9-x^2)}{(9-x^2)^4}$$

$$= \frac{36(9-x^2)[9-x^2+4x^2]}{(9-x^2)^4}$$

$$y'' = \frac{36(3x^2+9)}{(9-x^2)^3}$$

② $36(3x^2+9) = 0$

$3x^2+9 = 0$

$3x^2 = -9$

$x^2 = -3$

$x = \pm\sqrt{-3}$ ~~~~

$(9-x^2)^3 = 0$

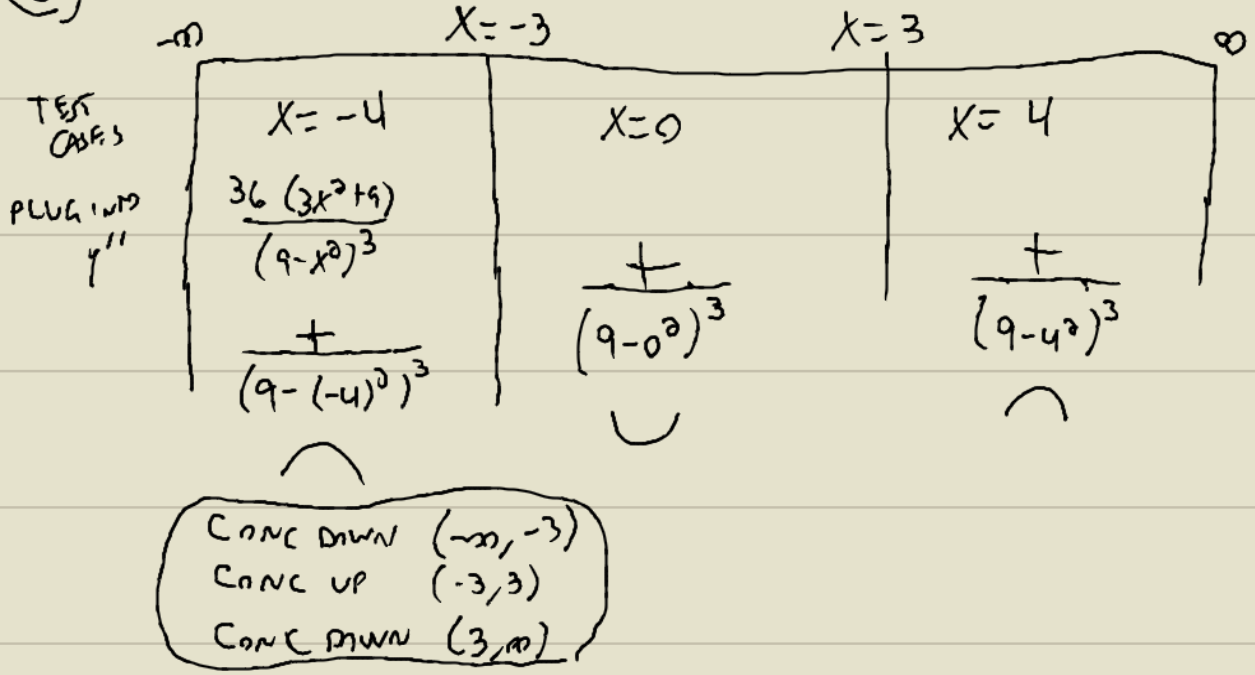
$9-x^2 = 0$

$9 = x^2$

$x = \pm\sqrt{9}$

$x = \pm 3$ C.V.'s

③



CONC DOWN $(-\infty, -3)$
CONC UP $(-3, 3)$
CONC DOWN $(3, \infty)$