9. $f(x) = \arccos(x^2)$ $\quad 0 \text{ to } \pi$ $\quad 0 \le x^2 < \pi$

$\frac{d}{dx}[\arccos u] = \frac{-u'}{\sqrt{1-u^2}}$

$u = x^2 \quad u' = 2x$

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

$f'(x) = \frac{-2x}{(1-x^4)^{1/2}}$ $\quad P$ / Q

$P' = -2 \quad Q' = \frac{1}{2}(1-x^4)^{-1/2} \cdot \frac{d}{dx}(1-x^4)$

$Q' = \frac{1}{2}(1-x^4)^{-1/2} \cdot (-4x^3)$

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

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

$f''(x) = \frac{-2(1-x^4)^{\frac{1}{2}} - (-2x)\left(\frac{-2x^3}{(1-x^4)^{1/2}}\right)}{[(1-x^4)^{1/2}]^2}$

$= \frac{-2(1-x^4)^{\frac{1}{2}} - \frac{4x^4}{(1-x^4)^{1/2}}}{(1-x^4)^1}$ ← I.O.

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

$= \frac{-2(1-x^4)^1 - 4x^4}{(1-x^4)^{3/2}}$

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

$= \frac{-2 - 2x^4}{(1-x^4)^{3/2}}$ ←

② $-2 - 2x^4 = 0$

$-2 = 2x^4$

$-1 = x^4$

$(1-x^4)^{\frac{3}{2}} = 0$

$1 - x^4 = 0$

$1 = x^4$

$x^{\frac{4}{1}} = 1$

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

$x = \pm 1$

$x = -\sqrt{\pi}$ $\quad x = -1$ $\quad x = 1$ $\quad x = \sqrt{\pi}$

$x = -1.1$	$x = 0$	$x = 1.1$
$\frac{-2-2x^4}{+}$	$\frac{-2-2x^4}{+}$	$\frac{-2-2x^4}{+}$
∩	∩	∩

NO POI'S

Conc Down

$(-\sqrt{\pi}, -1)$

$(-1, 1)$

$(1, \sqrt{\pi})$