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$$\lim_{h \to 0} \cos(a+h) = \cos a$$

$$\lim_{h \to 0} (\cos a \cdot \cos h - \sin a \cdot \sin h) = \cos a$$

$$\cos a \cdot 1 - \cancel{\sin a \cdot 0}) = \cos a$$

$$\cos a = \cos a$$

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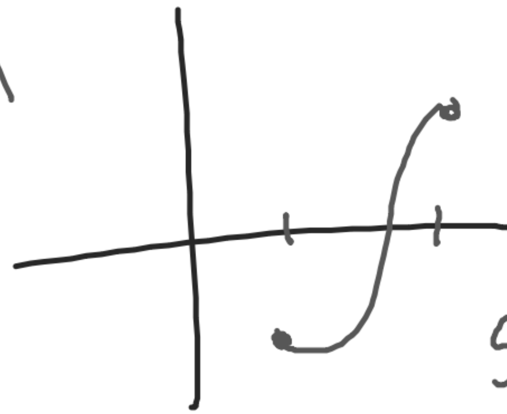
$x^4 + x - 3 = 0 \qquad (1,2)$



$f(1) = 1^4 + 1 - 3 = -1$

$f(2) = 2^4 + 2 - 3 = 15$

SINCE $f(1) < 0$ AND $f(2) > 0$ AND $f(x)$ IS CONTINUOUS THEN BY THE INTERMEDIATE VALUE THEOREM $f(x)$ HAS A ROOT ON $(1,2)$.

$X = X^3 + 1$

$0 = X^3 - X + 1$

IF $x = 0$

$f(0) = 0^3 - 0 + 1$

$f(0) = 1$

IF $X = -2$

$f(-2) = (-2)^3 - {-2} + 1$

$= -8 + 2 + 1$

$= -5$

SINCE $f(0) > 0$ AND

$f(-2) < 0$ AND

$f(x)$ IS CONTINUOUS,

BY THE IVT THERE IS

A VALUE X SUCH THAT

$f(x) = 0$.

$$\lim_{x \to \infty} \frac{3x^2 + 7x^3 - 9}{x^2 - 15x + 12x^3}$$

$$\lim_{x \to \infty} \sqrt{9+x^2} - 3x \cdot \frac{\sqrt{9+x^2} + 3x}{\sqrt{9+x^2} + 3x}$$

$$\lim_{x \to \infty} \frac{9 + x^2 - 9x^2}{\sqrt{9+x^2} + 3x} = \lim_{x \to \infty} \frac{-8x^2 + 9}{}$$