

$$f(x) = x^3 + x^2 - 1$$

To find function where  $|\phi'| < 1$ , apply this:

$$\phi(x) \text{ or } x = x - \frac{f(x)}{f'(x)}$$

$$\therefore f(x) = x^3 + x^2 - 1$$

$$\therefore f'(x) = 3x^2 + 2x$$

$$x = x - \frac{x^3 + x^2 - 1}{3x^2 + 2x}$$

$$x = \frac{3x^3 + 2x^2 - x^3 - x^2 + 1}{3x^2 + 2x}$$

$$x = \frac{2x^3 + x^2 + 1}{3x^2 + 2x} \rightarrow \text{This will be our } \phi(x)$$

Now check if it returns  $f(x)$  again.

Cross multiplying

$$\overset{x^3}{3x^3} + \overset{x^2}{2x^2} = 2x^3 + x^2 + 1$$

$$\boxed{x^3 + x^2 - 1 = 0}$$