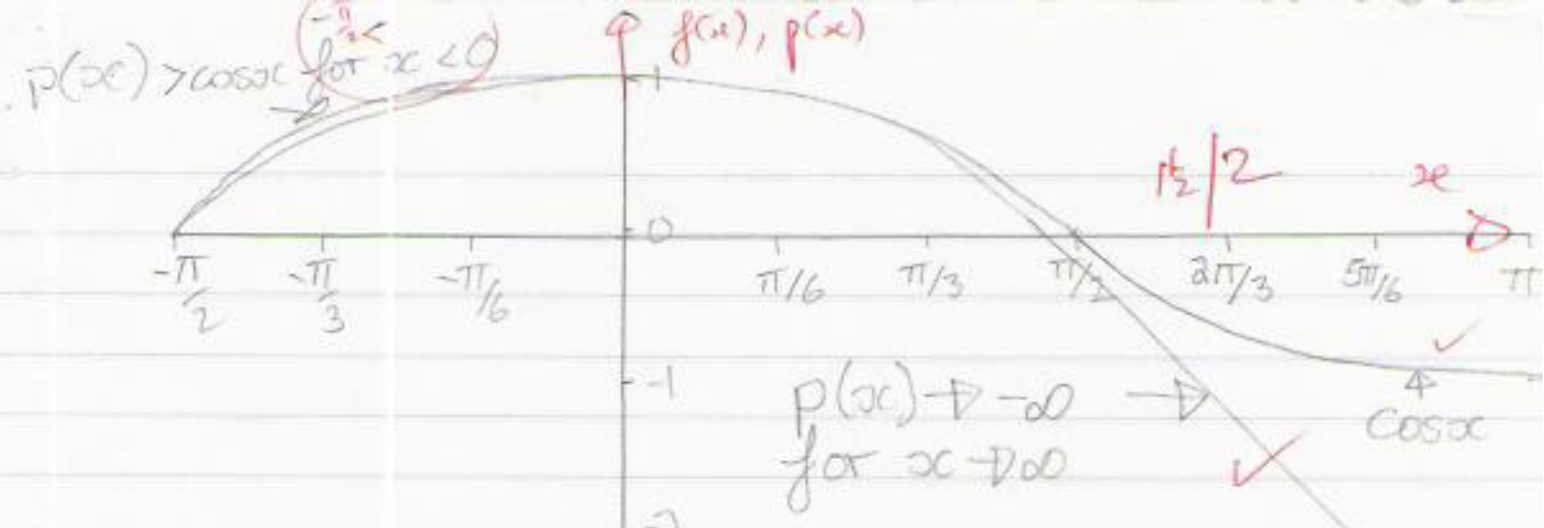

$1\frac{1}{2}/2$

The polynomial is a good approximation for $\cos x$ in the range $-\pi/2 \le x \le \frac{\pi}{2}$ but for $x > \frac{\pi}{2}$ the graphs for $\cos x$ and $p(x)$ diverge. !

careful.

ii) $2\cos x = 3x$

Sub for $\cos x \simeq p(x)$

$2(1 - 0.0343x - 0.4232x^2) = 3x$

$0.8464x^2 + 3.0686x - 2 = 0$

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

$= \dfrac{-3.0686 \pm \sqrt{(3.0686)^2 - 4 \times 0.8464 \times -2}}{2 \times 0.8464}$

$= \dfrac{-3.0686 \pm 4.0234}{1.6928}$

$= 0.5640$ or -4.190

$\frac{1}{2}/1$

$2/2$

$2/2$

correct to four d.p. The second solution is outside the range of values for which $p(x)$ is valid, hence the solution requested is 0.5640.

$1/1$

iii) $2\cos x = 3x$

An approximate soln is $x = 0.5640$. Use the Newton-Raphson method with $f(x) = 3x - 2\cos x$ and $f'(x) = 3 + 2\sin x$

$x_{r+1} = x_r - \dfrac{f(x)}{f'(x)}$

$1/1$

$2/2$