(1) let $p(x) = x^3 + 3x^2 + 3x + 1$

(i) when $p(x)$ is divided by $x+1$ remainder by remainder theorem

$= p(-1)$

$= (-1)^3 + 3\times(-1)^2 + 3(-1) + 1$

$= -1 + 3 - 3 + 1$

$= 0$

(ii) when $p(x)$ is divided by $x - \frac{1}{2}$ remainder by remainder theorem

$= p\left(\frac{1}{2}\right)$

$= \left(\frac{1}{2}\right)^3 + 3\times\left(\frac{1}{2}\right)^2 + 3\times\frac{1}{2} + 1$

$= \frac{1}{8} + \frac{3}{4} + \frac{3}{2} + \frac{1}{1}$

$= \frac{1 + 6 + 12 + 8}{8}$

$= \frac{27}{8}$

(iii) when $p(x)$ is divided by x remainder by remainder theorem

$= p(0)$

$= 0^3 + 3\times0^2 + 3\times0 + 1$

$= 1$

(iv) when $p(x)$ is divided by $x+\pi$ remainder by remainder theorem

$= p(-\pi)$

$= (-\pi)^3 + 3\times(-\pi)^2 + 3(-\pi) + 1$

$= -\pi^3 + 3\pi^2 - 3\pi + 1$

(v) when $p(x)$ is divided by $5+2x$ remainder by remainder theorem

$= p\left(-\frac{5}{2}\right)$

$= \left(-\frac{5}{2}\right)^3 + 3\times\left(-\frac{5}{2}\right)^2 + 3\left(-\frac{5}{2}\right) + 1$

$= -\frac{125}{8} + \frac{75}{4} - \frac{15}{2} + \frac{1}{1}$

$= \frac{-125 + 150 - 60 + 8}{8}$

$= -\frac{27}{8}$