Else math.com

3(i) $p(x) = x^2 + x + k$

$x-1$ is a factor of $p(x)$

$\therefore p(1) = 0$ (by factor th.)

$1^2 + 1 + k = 0$

$\Rightarrow k = -2$

3(ii) $p(x) = 2x^2 + kx + \sqrt{2}$

$x-1$ is a factor of $p(x)$

$\therefore$ by factor theorem

$p(1) = 0$

$2 \times 1^2 + k \times 1 + \sqrt{2} = 0$

$\Rightarrow 2 + k + \sqrt{2} = 0$

$\Rightarrow k = -2 - \sqrt{2}$

3(iii) $p(x) = kx^2 - \sqrt{2}x + 1$

$x-1$ is a factor of $p(x)$

$\therefore$ by factor theorem

$p(1) = 0$

$k \times 1^2 - \sqrt{2} \times 1 + 1 = 0$

$\Rightarrow k - \sqrt{2} + 1 = 0$

$\Rightarrow k = \sqrt{2} - 1$

3(iv) $p(x) = kx^2 - 3x + k$

$\because x-1$ is a factor of $p(x)$

$\therefore$ by factor theorem

$k \times 1^2 - 3 \times 1 + k = 0$

$\Rightarrow k - 3 + k = 0$

$\Rightarrow 2k - 3 = 0$

$\Rightarrow k = \frac{3}{2}$

4(i) $12x^2 - 7x + 1$

$= 12x^2 - 4x - 3x + 1$

$= 4x(3x-1) - 1(3x-1)$

$= (4x-1)(3x-1)$

4(ii) $2x^2 + 7x + 3$

$= 2x^2 + 6x + x + 3$

$= 2x(x+3) + 1(x+3)$

$(x+3)(2x+1)$

4(iii) $6x^2 + 5x - 6$

$= 6x^2 + 9x - 4x - 6$

$= 3x(2x+3) - 2(2x+3)$

$= (2x+3)(3x-2)$

4(iv) $3x^2 - x - 4$

$= 3x^2 - 4x + 3x - 4$

$= x(3x-4) + 1(3x-4)$

$= (3x-4)(x+1)$

5(i) let $x^3 - 2x^2 - x + 2$

possible zeros are $\pm 1, \pm 2$

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

$= 1 - 2 - 1 + 2$

$= 0$

$x-1$ is a factor of $p(x)$

by factor theorem