Exercise 4.2

1) Find the roots of the following quadratic equations by factorisation:

(i) $x^2 - 3x - 10 = 0$

$\Rightarrow x^2 - 5x + 2x - 10$

$\Rightarrow x(x-5) + 2(x-5)$

$\Rightarrow (x-5)(x+2)$

The roots of this equation $x^2 - 3x - 10 = 0$ are the various values of x for which $(x-5)(x+2) = 0$

Therefore $x - 5 = 0$ or $x + 2 = 0$

$\Rightarrow x = 5$ or $x = (-2)$

(ii) $2x^2 + x - 6 = 0$

Taking LHS,

$\Rightarrow 2x^2 + 4x - 3x - 6$

$\Rightarrow 2x(x+2) - 3(x+2)$

$\Rightarrow (x+2)(2x-3)$

The roots of this equation, $2x^2 + x - 6 = 0$, are the values of x for which $(x-5)(x+2) = 0$

Therefore, $x+2 = 0$ or $2x - 3 = 0$

$\Rightarrow x = (-2)$ or $x = 3/2$

(iii) $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$

Taking LHS

$\Rightarrow \sqrt{2}x^2 + 5x + 2x + 5\sqrt{2}$

$\Rightarrow x(\sqrt{2}x + 5) + \sqrt{2}(\sqrt{2}x + 5) = (\sqrt{2}x + 5)(x + \sqrt{2})$

The roots of this equation $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$, are the values of x for which $(x+5)(x+\sqrt{2}) = 0$

Therefore $\sqrt{2}x + 5 = 0$ or $x + \sqrt{2} = 0$

$\Rightarrow x = -5/\sqrt{2}$ or $x = -\sqrt{2}$

(iv) $2x^2 - x + \frac{1}{8} = 0$

Taking LHS

$\Rightarrow 1/8(16x^2 - 8x + 1)$

$= 1/8(16x^2 - 4x - 4x + 1)$

$= 1/8((4x(4x-1) - 1(4x-1))$

$= 1/8(4x-1)^2$

The roots of this equation, $2x^2 - x + 1/8 = 0$ are the values of x for which $(4x-1)^2 =$

Therefore $(4x-1) = 0$ or $(4x-1) = 0$

$\Rightarrow x = 1/4$ or $x = 1/4$.

(v) $100x^2 - 20x + 1 = 0$

Taking LHS,

$= 100x^2 - 10x - 10x + 1$

$= 10x(10x-1) - 1(10x-1)$

$= (10x-1)^2$

$\Rightarrow 1/10$ or $x = 1/10$