Exercise 2.3

Find the zeroes of the following polynomials by factorization method and verify the relations between the zeroes and the coefficients of the polynomials.

Question 7:

$2s^2 - (1 + 2\sqrt{2})s + \sqrt{2}$

Answer 7:

Let $f(s) = 2s^2 - (1 + 2\sqrt{2})s + \sqrt{2}$

$= 2s^2 - s - 2\sqrt{2}s + \sqrt{2}$

$= s(2s - 1) - \sqrt{2}(2s - 1)$

$= (2s - 1)(s - \sqrt{2})$

So, the value of $2s^2 - (1 + 2\sqrt{2})s + \sqrt{2}$ is zero when 2s – 1 = 0 or $s - \sqrt{2} = 0$

i.e., when $s = \frac{1}{2}$ or $s = \sqrt{2}$

So, the zeroes of $2s^2 - (1 + 2\sqrt{2})s + \sqrt{2}$ are $\frac{1}{2}$ and $\sqrt{2}$.

$\therefore$ Sum of zeroes $= \frac{1}{2} + \sqrt{2} = \frac{1+2\sqrt{2}}{2} = \frac{-[-(1+2\sqrt{2})]}{2}$

$$= -\frac{(coefficinet\ of\ \ s)}{(coefficinet\ of\ s^2)}$$

And product of zeroes $= \frac{1}{2}.\sqrt{2} = \frac{1}{\sqrt{2}}$

$$= \frac{Constant\ term}{coefficinet\ of\ s^2}$$

Hence, the relations between the zeroes and the coefficients of the polynomial is verified.