1. Find the multiplicative inverse of $2 - 3i$

Ans) Let $z = 2 - 3i$.

Then, the multiplicative inverse of z is

$$\frac{1}{z} = \frac{1}{2 - 3i} = \frac{1}{2 - 3i} \times \frac{2 + 3i}{2 + 3i}$$

$$= \frac{2 + 3i}{4 + 9} = \frac{2}{13} + \frac{3}{13}i$$

2. Express $\dfrac{2+i}{2-i}$ in the form $a + ib$.

Ans)

$$\dfrac{(2+i)}{(2-i)} = \dfrac{(2+i)\times (2+i)}{(2-i)\times (2+i)} = \dfrac{(4+4i+i^2)}{(4-i^2)} \qquad \left[i^2 = -1\right]$$

$$= \dfrac{(4+4i-1)}{(4--1)}$$

$$= \dfrac{(3+4i)}{5} = \dfrac{3}{5} + \dfrac{4i}{5} = a+ib$$