

$$(i) \frac{3}{(1+i)(2+i)}$$

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

$$(ii) \frac{1+i}{1-i} = \frac{(1+i)(2+i)}{(1-i)(2+i)} = \frac{2+3i+i^2}{1-2i-2-i^2} = \frac{1+3i}{-1-3i}$$

$$(i) - \frac{(2+2i+4i+4i^2)}{2+6i-4} + \frac{(1-2i)}{(1-2i)}$$

$$i - \frac{(-2+6i)}{(1-2i)} + \frac{(1-2i)}{(1-2i)}$$

$$\frac{-1-7i}{1-i^2}$$

$$\frac{3-3i-1+i^2}{1-i^2}$$

$$(ii) \frac{2i(i-1) + (\sqrt{3}-i)(1+i)(1+i)}{2i^2-2i + (\sqrt{3}-i) + (1+2i+i^2)}$$

$$\frac{-2-2i + (\sqrt{3}-i) + (1+2i+i^2)}{(2i^2-2i) + (\sqrt{3}-i) + (1+2i+i^2)}$$

$$\frac{-2-2i + (\sqrt{3}-i) + (1+2i+i^2)}{(2i^2-2i) + (\sqrt{3}-i) + (1+2i+i^2)}$$

$$\frac{-2+\sqrt{3}+i}{-2+\sqrt{3}+i}$$

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