

$$3ai) \left(\frac{1+i}{1-i} \right)^3$$

$$= \frac{1+i}{1-i} \times \frac{1+i}{1+i} = \frac{1+i}{1-i}$$

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

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

$$= \frac{1+2i+(-1)}{1-(-1)} = \frac{2i}{2} = i^3 = 0 + i^3$$

$$= 0 + i^1$$

ii)

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

$$\frac{3}{2+3i} \times \frac{2-3i}{2-3i} \rightarrow \frac{3}{2+3i}$$

$$\frac{3(2-3i)}{(2+3i)(2-3i)} \rightarrow \frac{6-9i}{13}$$

$$(2+3i)(2-3i) = 4 - 3i + 3i - 9i^2 = 4 - 9(-1) = 4 + 9 = 13$$