

3aii

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

$$\frac{3}{1+3i} \times \frac{1-3i}{1-3i} = \frac{3-9i}{1-3i+3i-9i^2} = \frac{3-9i}{10}$$

$$= \frac{3}{10} - \frac{9i}{10}$$

3aii

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

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

So, $i + 0$.

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

$$-1 \times \left(\frac{1+i}{1-i} \right) = \frac{-1-i}{1-i} = -i$$

So, $-i + 0$.