

Q3: a: Express in term $a+bi$

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

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

$1+1=2$

$-i+i=0$

$1-1=0$

$-i-i=-2i$

$\frac{2+0i}{0-2i}$

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

$4-1=3$

$0+0=0$

$0-4=-4$

$0+0=0$

$\frac{3+0i}{-4+0i} \left(\frac{2+0i}{0-2i}\right)$

$6-1=5+0i$

$0+0=0$

$0-1=-1$

$8+0=8i$

ANS: $\frac{5+0i}{-1+8i}$

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

$2-1=1$

$i+2i=3i$

$\frac{3}{3i} \times \frac{-3i}{-3i}$

ANS: $9-3i$

f	o	i	l
1×1	$1 \times i$	$i \times 1$	$i \times i$
1	i	i	$i^2 = -1$

f	o	i	l
1×1	$1 \times -i$	$i \times 1$	$i \times -i$
1	-i	i	$-i^2 = 1$
1×1	$1 \times -i$	$-i \times 1$	$-i \times -i$
1	-i	-i	$i^2 = -1$

f	o	i	l
2×2	$2 \times 0i$	$0i \times 2$	$0i \times 0i$
4	0i	0i	$0i^2 = -1$
0×0	$0 \times -2i$	$-2i \times 0$	$-2i \times -2i$
0	0i	0i	$4i^2 = -4$

f	o	i	l
3×2	$3 \times 0i$	$0i \times 2$	$0i \times 0i$
6	0i	0i	$0i^2 = -1$
-4×0	$-4 \times 2i$	$0i \times 0$	$0i \times -2i$
0	8i	0i	$0i^2 = -1$

f	o	i	l
1×2	$1 \times i$	$i \times 2$	$i \times i$
2	i	2i	$i^2 = -1$
$3 \times -3i$	$3i \times -3i$		
-3i	$-9i^2 = 9$		