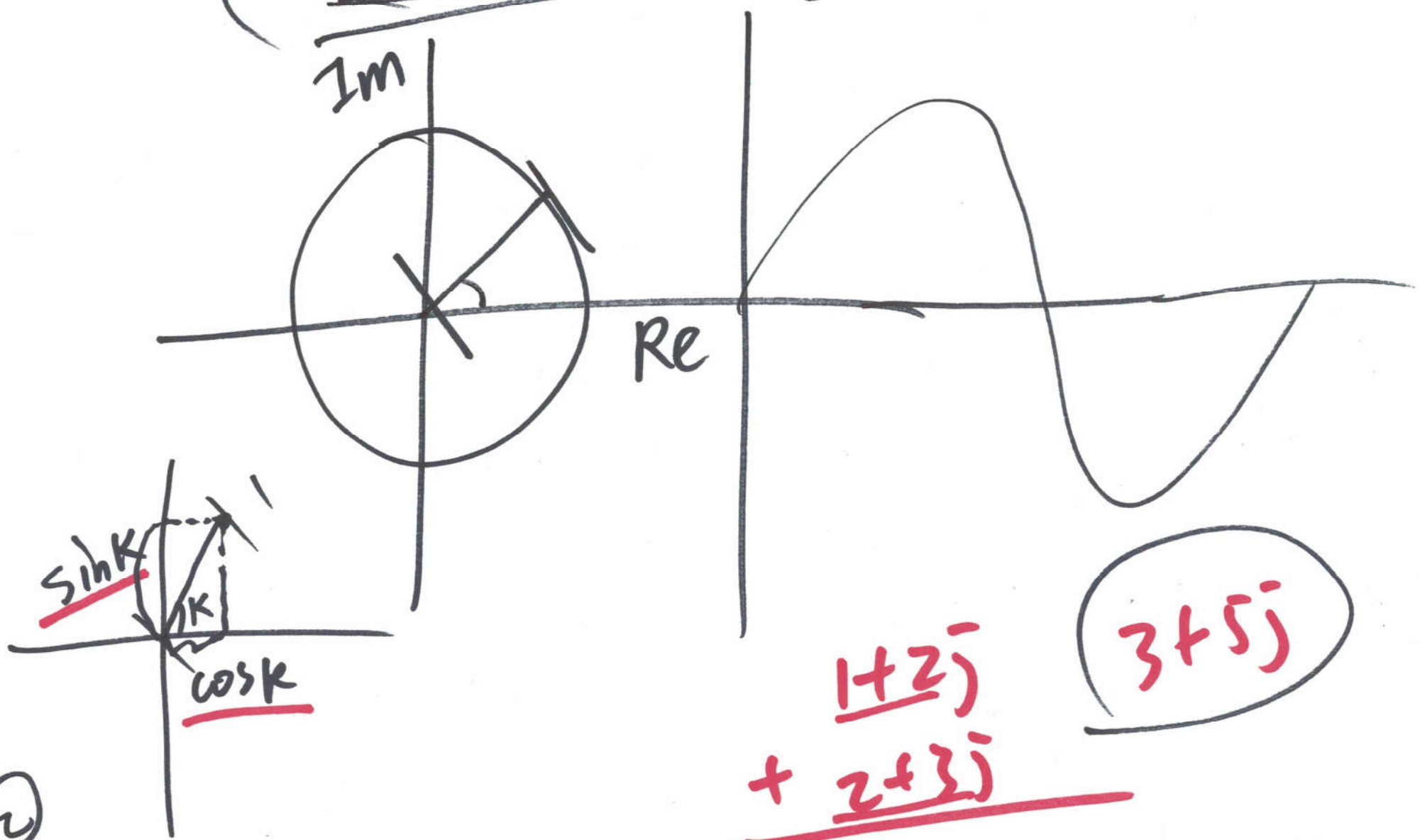
$$A_I \cos 2\pi f t + A_Q \sin 2\pi f t = \sqrt{A_I^2 + A_Q^2} \cos\left(2\pi f t + \tan^{-1}\frac{A_Q}{A_I}\right)$$

~~cosk + j~~

$\cos k + j \sin k = e^{jk}$

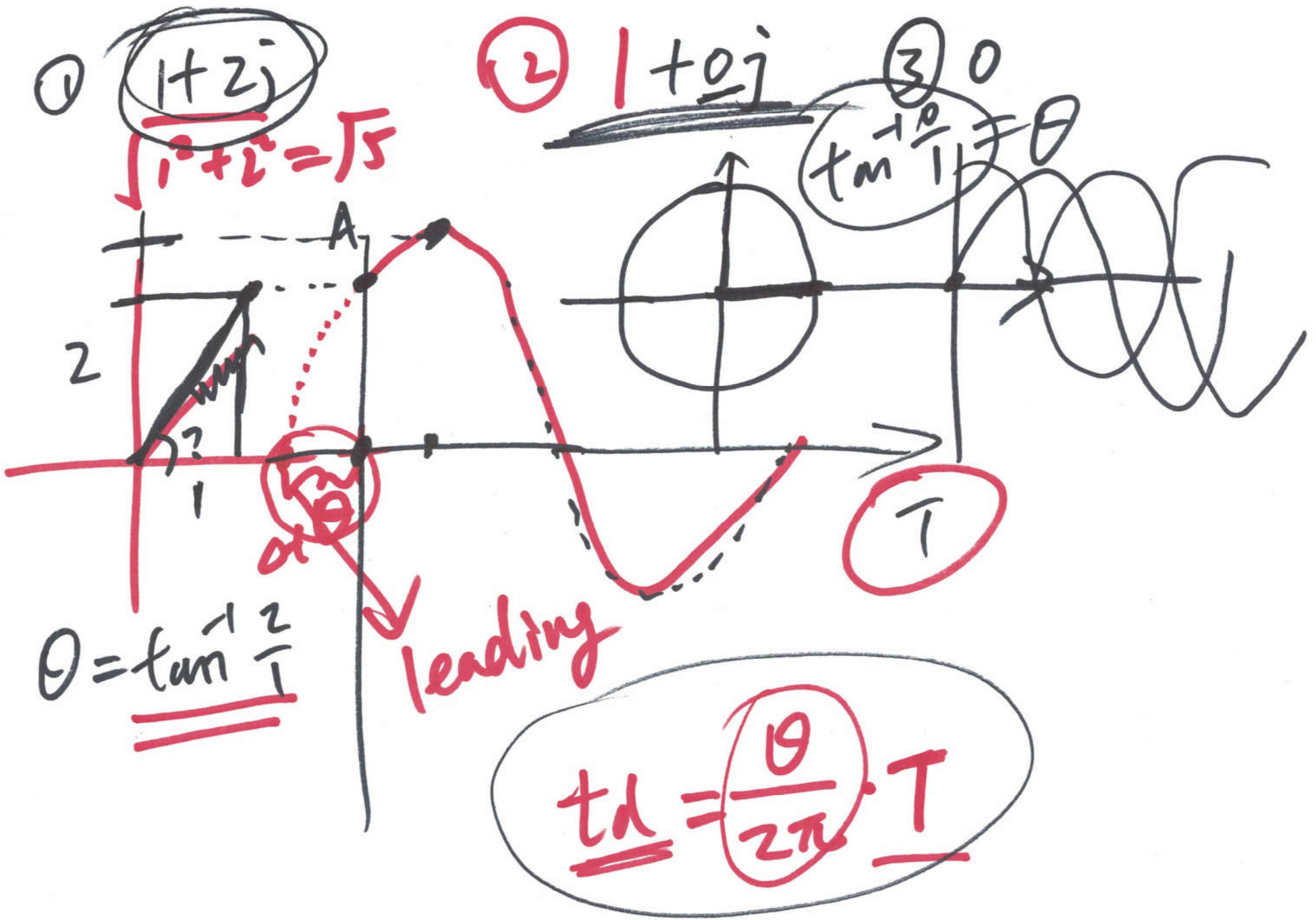
$\sqrt{\cos^2 k + \sin^2 k}$



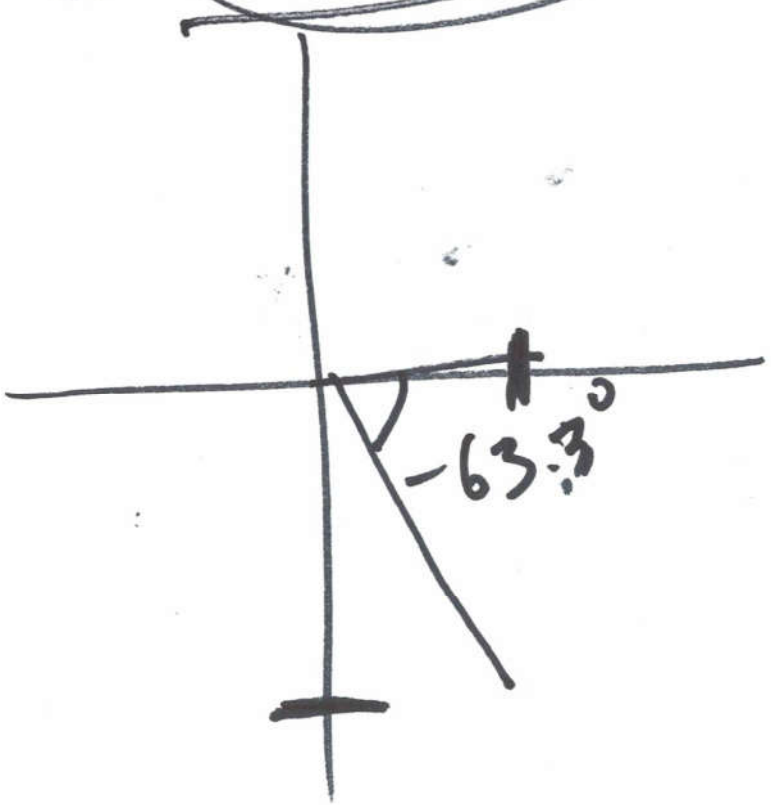
$1 + 2j$

$+ \; 2 + 3j$

$3 + 5j$


① 1+2j
$1^2+2^2=\sqrt{5}$
A
2
1
θ
leading
$\theta=\tan^{-1}\frac{2}{1}$
② 1+0j
③ 0
$\tan^{-1}\frac{0}{1}=\theta$
T
$t_d=\frac{\theta}{2\pi}\cdot T$

(4) $1-2j$



$\theta = \tan^{-1}\frac{-2}{1}$

(5) $V_i: 1+2j$

$V_o: 1-2j$

Attenuation: $\left|\frac{V_o}{V_i}\right|$

$= \frac{\sqrt{1^2+(-1)^2}}{\sqrt{1^2+2^2}} = \frac{\sqrt{2}}{\sqrt{5}}$

$= \frac{1.414}{2.232}$

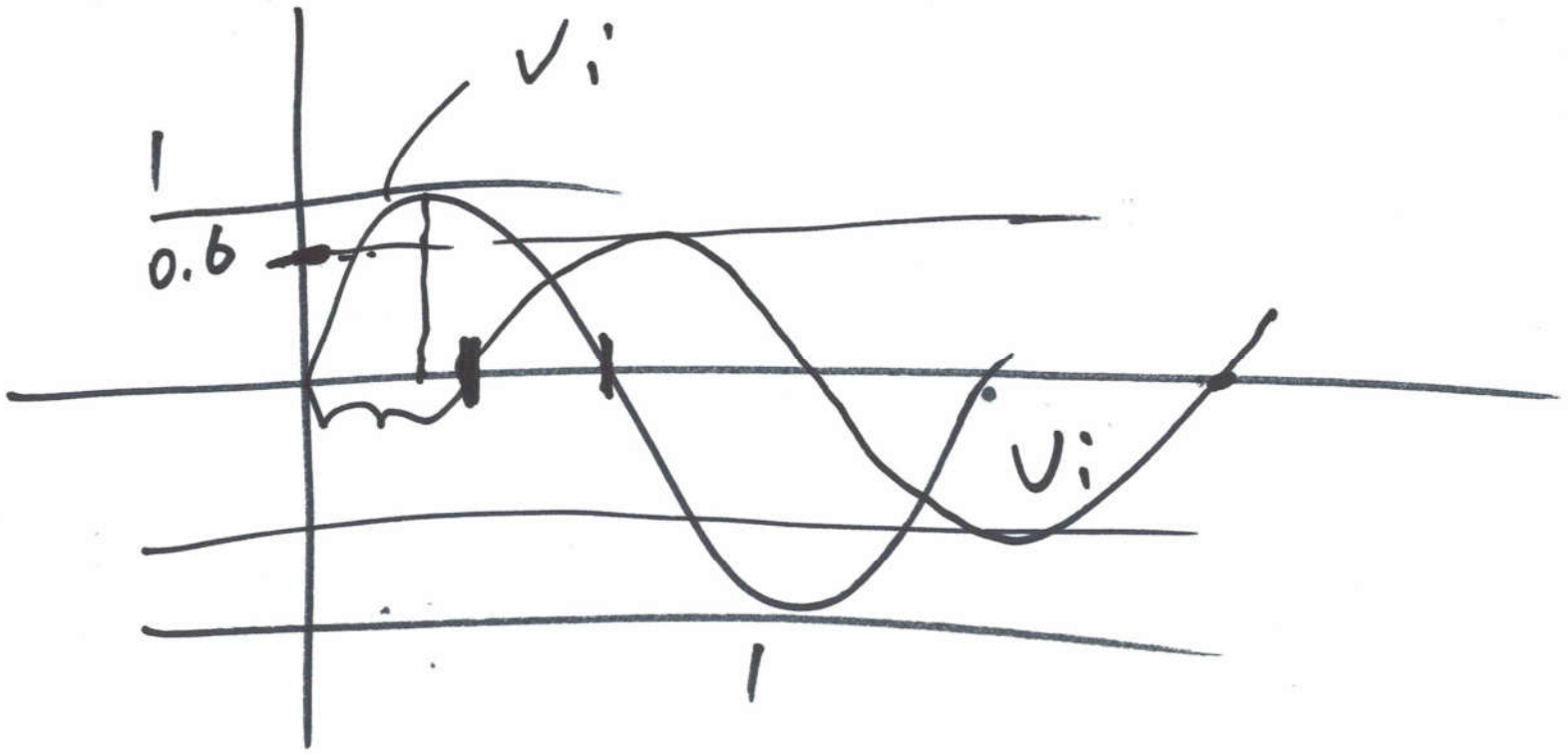
$= 60\%$

$\angle V_o - \angle V_i$

$= \tan^{-1}\frac{-1}{1} - \tan^{-1}\frac{2}{1}$

$= -45 - 63.4 = -108.4°$

(4)


V_i
1
0.6
V_i
1