[問題3]　正しく対応させなさい。（初めに左側を，次に右側を選びなさい。正しく対応していれば消えます。）

$\sin 2\alpha$	$\dfrac{1-\cos 2\alpha}{2}$
$\cos 2\alpha$	$3\sin\alpha - 4\sin^3\alpha$
$\sin^2\alpha$	$4\cos^3\alpha - 3\cos\alpha$
$\cos^2\alpha$	$\cos^2\alpha - \sin^2\alpha$
$\sin 3\alpha$	$\dfrac{1+\cos 2\alpha}{2}$
$\cos 3\alpha$	$2\sin\alpha\cos\alpha$

[公式は現地調達4]tan αに関するもの

(1)/(3)

$$\tan(\alpha+\beta) = \frac{\sin(\alpha+\beta)}{\cos(\alpha+\beta)} = \frac{\sin\alpha\cos\beta+\cos\alpha\sin\beta}{\cos\alpha\cos\beta-\sin\alpha\sin\beta} = \frac{\frac{\sin\alpha}{\cos\alpha}\frac{\cos\beta}{\cos\beta}+\frac{\cos\alpha}{\cos\alpha}\frac{\sin\beta}{\cos\beta}}{\frac{\cos\alpha}{\cos\alpha}\frac{\cos\beta}{\cos\beta}-\frac{\sin\alpha}{\cos\alpha}\frac{\sin\beta}{\cos\beta}} = \frac{\tan\alpha+\tan\beta}{1-\tan\alpha\tan\beta}$$

$$= \frac{\tan\alpha+\tan\beta}{1-\tan\alpha\tan\beta} \cdot\cdot(21)$$

(2)/(4)

$$\tan(\alpha-\beta) = \frac{\sin(\alpha-\beta)}{\cos(\alpha-\beta)} = \frac{\sin\alpha\cos\beta-\cos\alpha\sin\beta}{\cos\alpha\cos\beta+\sin\alpha\sin\beta} = \frac{\frac{\sin\alpha}{\cos\alpha}\frac{\cos\beta}{\cos\beta}-\frac{\cos\alpha}{\cos\alpha}\frac{\sin\beta}{\cos\beta}}{\frac{\cos\alpha}{\cos\alpha}\frac{\cos\beta}{\cos\beta}+\frac{\sin\alpha}{\cos\alpha}\frac{\sin\beta}{\cos\beta}} = \frac{\tan\alpha-\tan\beta}{1+\tan\alpha\tan\beta}$$

$$= \frac{\tan\alpha-\tan\beta}{1+\tan\alpha\tan\beta} \cdot\cdot(22)$$

＜tan αの2倍角公式＞

(13)/(14)

$$\tan 2\alpha = \frac{\sin 2\alpha}{\cos 2\alpha} = \frac{2\sin\alpha\cos\alpha}{\cos^2\alpha-\sin^2\alpha} = \frac{\frac{2\sin\alpha\cos\alpha}{\cos^2\alpha}}{\frac{\cos^2\alpha}{\cos^2\alpha}-\frac{\sin^2\alpha}{\cos^2\alpha}}$$

$$= \frac{2\tan\alpha}{1-\tan^2\alpha} \cdot\cdot(23)$$

＜tan αの半角公式＞

(17)/(18)

$$\tan^2\alpha = \frac{\sin^2\alpha}{\cos^2\alpha} = \frac{\frac{1-\cos2\alpha}{2}}{\frac{1+\cos2\alpha}{2}}$$

$$= \frac{1-\cos2\alpha}{1+\cos2\alpha} \cdot\cdot(24)$$

＜tan αの3倍角公式＞

$$\tan 3\alpha$$

(19)/(20)

$$= \frac{\sin 3\alpha}{\cos 3\alpha} = \frac{3\sin\alpha - 4\sin^3\alpha}{4\cos^3\alpha - 3\cos\alpha}$$

$$= \frac{\dfrac{3\sin\alpha}{\cos^3\alpha} - \dfrac{4\sin^3\alpha}{\cos^3\alpha}}{\dfrac{4\cos^3\alpha}{\cos^3\alpha} - \dfrac{3\cos\alpha}{\cos^3\alpha}} = \frac{3t\dfrac{1}{c^2} - 4t^3}{4 - \dfrac{3}{c^2}}$$

以下 $\cos\alpha = c$ $\tan\alpha = t$ で表す

数I三角関数最重要公式 $s^2 + c^2 = 1$ により $t^2 + 1 = \dfrac{1}{c^2}$

$$= \frac{3t(t^2+1) - 4t^3}{4 - 3(t^2+1)} = \frac{3t - t^3}{1 - 3t^2}$$

$$= \frac{3\tan\alpha - \tan^3\alpha}{1 - 3\tan^2\alpha}$$

[問題4] 正しく対応させなさい。（初めに左側を，次に右側を選びなさい。正しく対応していれば消えます。）

$\tan(\alpha + \beta)$

$\tan(\alpha - \beta)$

$\tan 2\alpha$

$\tan 3\alpha$

$\tan^2\alpha$

$\dfrac{3\tan\alpha - \tan^3\alpha}{1 - 3\tan^2\alpha}$

$\dfrac{\tan\alpha + \tan\beta}{1 - \tan\alpha\tan\beta}$

$\dfrac{2\tan\alpha}{1 - \tan^2\alpha}$

$\dfrac{1 - \cos 2\alpha}{1 + \cos 2\alpha}$

$\dfrac{\tan\alpha - \tan\beta}{1 + \tan\alpha\tan\beta}$