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一、 **1.** (4)　　**2.** (5)　　**3.** (4)

二、 **1.** (1)(3)(5)　　**2.** (1)(2)

三、 **1.** $-\dfrac{1}{2}$　　**2.** $-\dfrac{27}{32}$　　**3.** $\dfrac{3}{11}$　　**4.** 2　　**5.** $-\dfrac{2}{3}\sqrt{2}$

四、 **1. (1)** $\dfrac{\sqrt{3}}{2}$　　**(2)** $120°$　　**2. (1)** 1　　**(2)** 0

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一、單一選擇題

1.　$\sin\alpha+\sin\beta=\dfrac{1}{2}\cdots\cdots①$，$\sin\alpha-\sin\beta=\dfrac{1}{3}\cdots\cdots②$，$①+②\ \Rightarrow\ 2\sin\alpha=\dfrac{5}{6}$，$\sin\alpha=\dfrac{5}{12}$

$\cos 2\alpha=1-2\sin^2\alpha=1-2(\dfrac{5}{12})^2=\dfrac{47}{72}$，故選(4)．　　　　　　　　【對應課本 P.50】

2.　(1)原式$=\sin(13°+17°)=\sin 30°=\dfrac{1}{2}$．　　　　(2)原式$=\cos(73°-13°)=\cos 60°=\dfrac{1}{2}$．

(3)原式$=\sin(2\times15°)=\sin 30°=\dfrac{1}{2}$．　　　　(4)原式$=\cos\dfrac{840°}{2}=\cos 420°=\dfrac{1}{2}$．

(5)原式$=-\cos(3\times20°)=-\cos 60°=-\dfrac{1}{2}$．故選(5)．　　　【對應課本 P.46，P.49，P.51】

3.　$\tan(72°-42°)=\tan 30°=\dfrac{1}{\sqrt{3}}\ \Rightarrow\ \dfrac{\tan 72°-\tan 42°}{1+\tan 72°\tan 42°}=\dfrac{1}{\sqrt{3}}$

$\Rightarrow\ \sqrt{3}\tan 72°-\sqrt{3}\tan 42°=1+\tan 72°\tan 42°$，故原式$=1$，故選(4)．【對應課本 P.48】

二、多重選擇題

1.　(1)○,取 α 終邊的點 $P(4,-3)$ 知 $\overline{OP}=5$，$\cos\alpha=\dfrac{4}{5}$．

(2)×,$135°<\dfrac{\alpha}{2}<180°\ \Rightarrow\ \cos\dfrac{\alpha}{2}=-\sqrt{\dfrac{1+\cos\alpha}{2}}=-\dfrac{3}{\sqrt{10}}$．

(3)○,$135°<\alpha<180°\ \Rightarrow\ \sin\dfrac{\alpha}{2}=\sqrt{\dfrac{1-\cos\alpha}{2}}=\dfrac{1}{\sqrt{10}}$．

(4)×,$\sin\alpha=-\sqrt{1-\cos^2\alpha}=-\dfrac{4}{5}$,$\sin 2\alpha=2\sin\alpha\cos\alpha=-\dfrac{24}{25}$．

(5)○,$\tan 2\alpha=\dfrac{2\tan\alpha}{1-\tan^2\alpha}=-\dfrac{24}{7}$．故選(1)(3)(5)．　　　　【對應課本 P.51，P.53】

2.　設 $\sin\theta$ 為 $8x^3-6x+1=0$ 之根 $\Rightarrow\ 8\sin^3\theta-6\sin\theta+1=0$

$\Rightarrow\ 3\sin\theta-4\sin^3\theta=\dfrac{1}{2}$ 得 $\sin 3\theta=\dfrac{1}{2}$

(1)○，$\sin 3\theta=\sin 30°=\dfrac{1}{2}$．

(2)○，$\sin 3\theta=\sin 390°=\dfrac{1}{2}$．

$(3)\times$，$\sin 3\theta = \sin 690° = \sin(-30°) = -\dfrac{1}{2}$．

$(4)\times$，$\sin 3\theta = \sin 990° = \sin(-90°) = -1$．

$(5)\times$，$\sin 3\theta = \sin 1350° = \sin 270° = -1$．故選(1)(2)．

三、填充題

1. 原式 $= \sin 80° \sin 200° + \cos 200° \cos 80° = \cos(200° - 80°) = \cos 120° = -\dfrac{1}{2}$．

2. 兩式平方後相加可得 $2 + 2(\sin\alpha\sin\beta + \cos\alpha\cos\beta) = \dfrac{5}{16}$

$\Rightarrow 2\cos(\alpha - \beta) = \dfrac{5}{16} - 2 = -\dfrac{27}{16}$，$\cos(\alpha - \beta) = -\dfrac{27}{32}$．

3. 設 $\angle EAC = \alpha$，則 $\tan\alpha = \dfrac{1}{3}$，$\tan(\theta + \alpha) = \dfrac{2}{3}$

$\tan\theta = \tan\left[(\theta + \alpha) - \alpha\right] = \dfrac{\tan(\theta + \alpha) - \tan\alpha}{1 + \tan(\theta + \alpha)\tan\alpha} = \dfrac{\dfrac{2}{3} - \dfrac{1}{3}}{1 + \dfrac{2}{3} \times \dfrac{1}{3}} = \dfrac{3}{11}$．

4. 原式 $= \dfrac{4\cos^3\theta - 3\cos\theta}{\cos\theta} + \dfrac{3\sin\theta - 4\sin^3\theta}{\sin\theta}$

$= 4\cos^2\theta - 4\sin^2\theta = 4\cos 2\theta = 4 \times \dfrac{1}{2} = 2$．

5. $9(1 - 2\sin^2\theta) + 18\sin\theta - 1 = 0$ $9\sin^2\theta - 9\sin\theta - 4 = 0 \Rightarrow (3\sin\theta + 1)(3\sin - 4) = 0$

$\Rightarrow \sin\theta = -\dfrac{1}{3}$ 或 $\dfrac{4}{3}$（不合）$\Rightarrow \cos\theta = -\sqrt{1 - \sin^2\theta} = -\dfrac{2}{3}\sqrt{2}$．

四、計算題

1. (1) $\sin A = \dfrac{11}{14} \Rightarrow \cos A = \sqrt{1 - (\dfrac{11}{14})^2} = \dfrac{5}{14}\sqrt{3}$

$\sin B = \dfrac{13}{14} \Rightarrow \cos B = \sqrt{1 - (\dfrac{13}{14})^2} = \dfrac{3}{14}\sqrt{3} \Rightarrow \sin(A + B) = \dfrac{11}{14} \times \dfrac{3\sqrt{3}}{14} + \dfrac{5\sqrt{3}}{14} \times \dfrac{13}{14} = \dfrac{\sqrt{3}}{2}$．

(2)由(1)知 $\angle A + \angle B = 60°$ 或 $120°$，但 $\sin B = \dfrac{13}{14} > \dfrac{\sqrt{3}}{2} \Rightarrow \angle B > 60°$，故 $\angle A + \angle B = 120°$．

2. (1) $\tan\alpha + \tan\beta = \dfrac{4}{3}$，$\tan\alpha\tan\beta = -\dfrac{1}{3}$，$\tan(\alpha + \beta) = \dfrac{\tan\alpha + \tan\beta}{1 - \tan\alpha\tan\beta} = \dfrac{\dfrac{4}{3}}{1 - (-\dfrac{1}{3})} = 1$．

(2) $\cos 2(\alpha + \beta) = \dfrac{1 - \tan^2(\alpha + \beta)}{1 + \tan^2(\alpha + \beta)} = \dfrac{1 - 1}{1 + 1} = 0$．