① $5\cos\left(x+\frac{\pi}{2}\right)$

$5\left(\cos x\cos\frac{\pi}{2}-\sin x\sin\frac{\pi}{2}\right)$

$5(\cos x\cdot 0-\sin x\cdot 1)$

$5(-\sin x)$

$\boxed{C\ -5\sin x}$

② $2\sin\left(3x+\frac{\pi}{6}\right)$

$2\left(\sin 3x\cos\frac{\pi}{6}+\cos 3x\sin\frac{\pi}{6}\right)$

$2\left(\sin 3x\cdot\frac{\sqrt{3}}{2}+\cos 3x\cdot\frac{1}{2}\right)$

$\sin 3x\cdot\sqrt{3}+\cos 3x$

$\boxed{E\ \cos 3x+\sqrt{3}\sin 3x}$

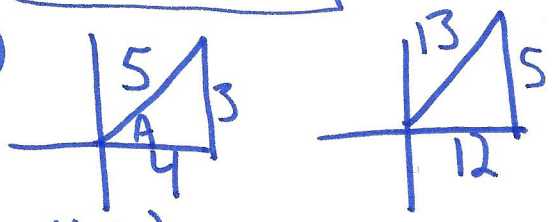
③ $\tan\left(\frac{\pi}{4}+x\right)$

$\frac{\tan\frac{\pi}{4}+\tan x}{1-\tan\frac{\pi}{4}\tan x}$

$\frac{1+\tan x}{1-1\cdot\tan x}$

$\boxed{E\ \frac{1+\tan x}{1-\tan x}}$

④



$\cos(A-B)$

$\cos A\cos B+\sin A\sin B$

$\frac{4}{5}\cdot\frac{12}{13}+\frac{3}{5}\cdot\frac{5}{13}$

$\frac{48}{65}+\frac{15}{65}=\boxed{63/65}$ D

⑤ $\sin 42\cos 48+\cos 42\sin 48$

A: 42 B: 48

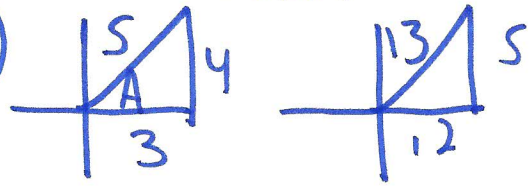
$\sin(42+48)$

$\sin(90)=\boxed{1}$ A

⑥ $\sin(90-\theta)=\boxed{\cos\theta}$ A

cofunction

⑦



$\sin(A+B)$

$\sin A\cos B+\cos A\sin B$

$\frac{4}{5}\cdot\frac{12}{13}+\frac{3}{5}\cdot\frac{5}{13}$

$\frac{48}{65}+\frac{15}{65}=\boxed{\frac{63}{65}}$ A

⑧ $\sin\theta=\cos\theta$

both + QI

both − QIII

$\boxed{C}$

⑨ $\sin 60=\cos 30$. co-function

$\cos 30=\cos(x+10)$

$30=x+10$

$\boxed{B\ x=20}$

or

$60+x+10=90$

$70+x=90$

$x=20$

⑩ $\cos 70\cos 40-\sin 70\sin 40$

A: 70 B: 40

$\cos(A+B)$

$\cos(70+40)$

$\boxed{C\ \cos 110}$

(11) $\sin 96\cos 24 + \cos 96\sin 24$

A: 96 B: 24

$\sin(A+B)$

$\sin(96+24) = \sin 120$

$\sin 60°$ A

(12) $\sin(180+A)$

$\sin 180\cos A + \cos 180\sin A$

$0\cdot\cos A + -1\cdot\sin A$

D $-\sin A$

(13) $\sin 210\cos 30 - \cos 210\sin 30$

$\sin(210-30)$

$\sin 180 =$ 0 C

(14) $\sin(30+45)$

$\sin 30\cos 45 + \cos 30\sin 45$

$\frac{1}{2}\cdot\frac{1}{\sqrt{2}} + \frac{\sqrt{3}}{2}\cdot\frac{1}{\sqrt{2}}$

$\frac{1}{2\sqrt{2}} + \frac{\sqrt{3}}{2\sqrt{2}}$

$\frac{1+\sqrt{3}}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}+\sqrt{6}}{4}$

$2\cdot\sqrt{2}\cdot\sqrt{2}$

$2\cdot 2$

(15) $\cos(2x-1)^\circ = \sin(3x+6)^\circ$

cofunctions: sin = cos when $\angle$'s are complimentary

$2x-1+3x+6=90$

$5x+5=90$

$5x=85$

$x=17$

(16) $\sin(x+20) = \cos x$

cofunction

$x+20+x=90$

$2x+20=90$

$2x=70$

$x=35$

(17) $\tan(A+B)$

$\frac{\tan A + \tan B}{1-\tan A\tan B}$

$\tan A = \frac{2}{3}$

$\tan B = \frac{1}{2}$

$\frac{\frac{2}{3}+\frac{1}{2}}{1-\frac{2}{3}\cdot\frac{1}{2}}$

$\frac{\frac{4}{6}+\frac{3}{6}}{\frac{6}{6}-\frac{2}{6}} = \frac{\frac{7}{6}}{\frac{4}{6}}$

$\frac{7}{6}\cdot\frac{6}{4} = \frac{7}{4}$ D

(18) $\sin 75 = \sin(30+45)$

$\sin 30\cos 45 + \cos 30\sin 45$

$\frac{1}{2}\cdot\frac{1}{\sqrt{2}} + \frac{\sqrt{3}}{2}\cdot\frac{1}{\sqrt{2}}$

$\frac{1+\sqrt{3}}{2\sqrt{2}}$

(19) $\sin\frac{\pi}{8}\cos\frac{3\pi}{8} + \cos\frac{\pi}{8}\sin\frac{3\pi}{8} = \cos\left(\frac{\pi}{8}-\frac{3\pi}{8}\right) =$

$\cos\left(-\frac{2\pi}{8}\right) = \cos\left(-\frac{\pi}{4}\right) = \frac{1}{\sqrt{2}}$