TEST 6

1) $S^6+C^6=(\underbrace{S^2+C^2}_{1}).(S^4-S^2C^2+C^4)$

$= \underbrace{S^4+C^4}-S^2C^2$

$(S^2+C^2)^2-2S^2C^2$

$= 1-3S^2C^2$ (payda)

$3(\underbrace{S^4+C^4}_{1-2S^2C^2})-1 = 3-6S^2C^2-1 = 2-6S^2C^2$

$= 2(1-3S^2C^2)$ (pay)

(C)

2) $\sqrt{1-S_x} = \sqrt{(C_{\frac{x}{2}}-S_{\frac{x}{2}})^2} = |\underbrace{C_{\frac{x}{2}}-S_{\frac{x}{2}}}_{+}| = C_{\frac{x}{2}}-S_{\frac{x}{2}}$

$C^2_{\frac{x}{2}}+S^2_{\frac{x}{2}}$ $\quad 2.S_{\frac{x}{2}}.C_{\frac{x}{2}}$ (payda)

$C_x = C^2_{\frac{x}{2}}-S^2_{\frac{x}{2}} = (C_{\frac{x}{2}}-S_{\frac{x}{2}}).(C_{\frac{x}{2}}+S_{\frac{x}{2}})$ (pay)

(A)

3) $t_x+C_x=3 \Rightarrow (\underbrace{t_x-C_x}_{\mp\sqrt{5}}).(\underbrace{t_x+C_x}_{3})=?$

$\Downarrow$

$t^2+2+C^2=9$

$\boxed{t^2+C^2=7}$

$(t_x-C_x)^2 = t^2-2+C^2 = 5$

$t_x-C_x = \mp\sqrt{5}$

(E)

4) $\frac{a.(1-S)-(2+S)}{2-S-S^2} = \frac{4S-1}{-1+S-(1-S^2)}$

$= \frac{4S-1}{S^2+S-2} = \frac{1-4S}{2-S-S^2}$

(-1)

$a.(1-S)-(2+S) = 1-4S$

$a.(1-S) = 3-3S$

$= 3(1-S)$

(D)

$a=3$

5) $\sin(\underbrace{x+\frac{2\pi}{3}}_{\alpha}).\cos(\underbrace{\frac{\pi}{3}-x}_{\beta})>0$ od. $\alpha+\beta=180°$

$\sin\beta.\cos\beta>0$

$\frac{\sin 2\beta}{2}>0$

$\sin 2\beta>0$ $\quad (k\in\mathbb{Z})$

$0+2k\pi < 2\beta < \pi+2k\pi$

$k\pi < \beta < \frac{\pi}{2}+k\pi$

$k\pi < \frac{\pi}{3}-x < \frac{\pi}{2}+k\pi$

$-k\pi > x-\frac{\pi}{3} > -\frac{\pi}{2}-k\pi$

$\frac{\pi}{3}-k\pi > x > -\frac{\pi}{6}-k\pi$

$\frac{4\pi}{3} \overset{(2)}{>} x > \frac{5\pi}{6}$

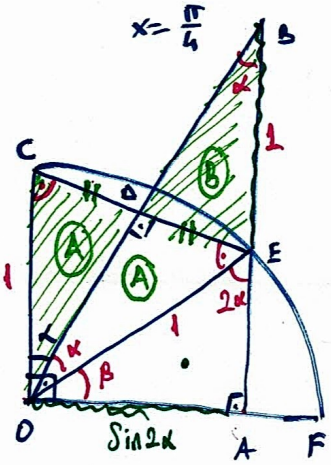
$\frac{7\pi}{6}$ (C)

6) $x-\frac{\pi}{5}+x+\frac{\pi}{5}=\frac{\pi}{2}$

$2x=\frac{\pi}{2}$

$x=\frac{\pi}{4}$ (B)

7)

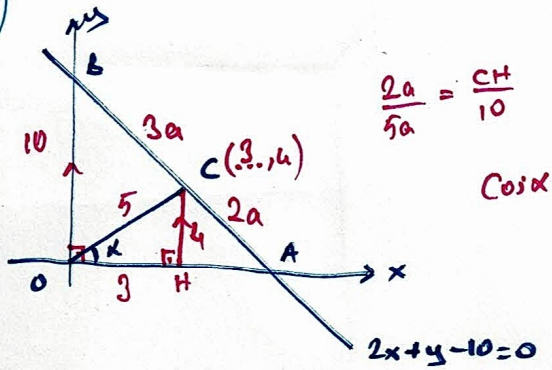


$2\alpha+\beta=90°$

$A+B=\frac{1.\sin 2\alpha}{2}$

(C)

8)



$\frac{2a}{5a}=\frac{CH}{10}$ $\quad |CH|=4$

$\cos\alpha=\frac{3}{5}$ (D)

9) $33C^2+28.2.S.C+16 = 33C^2+56SC+16$

16.1

$16.(S^2+C^2)$

$16S^2+16C^2$

$= 49C^2+56SC+16S^2$

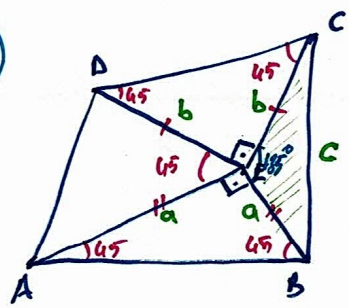
$= (7C+4S)^2$

$a.C_x+b.S_x$ → max $=\sqrt{a^2+b^2}$, min $=-\sqrt{a^2+b^2}$

$7C_x+4S_x \Rightarrow \max \sqrt{7^2+4^2}=\sqrt{65}$

$= \sqrt{65}^2 = 65$ (C)

10)



$\frac{a^2}{2}+\frac{b^2}{2}+\frac{1}{2}.a.b.\frac{\sqrt{2}}{2}+\frac{1}{2}.a.b.\frac{\sqrt{2}}{2}$

$a.b.\frac{\sqrt{2}}{2}$

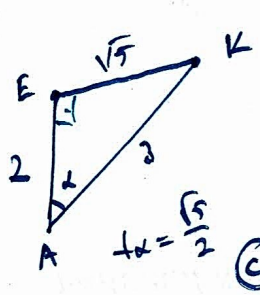
$\boxed{a^2+b^2+\sqrt{2}ab=36}$

$c^2=a^2+b^2-2.a.b.c_{135}$ $\quad c_{135}=-\frac{\sqrt{2}}{2}$

$c^2 \geq a^2+b^2+\sqrt{2}ab=36$ (C)

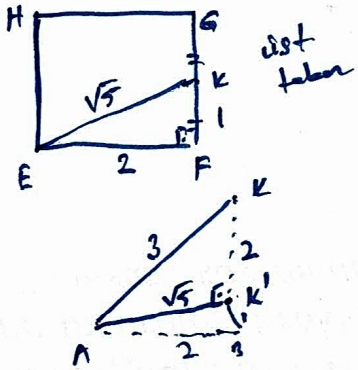
$c \geq 6$

11)



$\sqrt{5}$

$\tan\alpha = \frac{\sqrt{5}}{2}$ (C)



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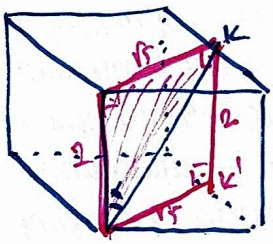


12)

$C_{5x} = -S_{3y}$

$C_{5x} = S_{(-2y)}$

$C_{5x} = C_{(90+3y)}$

$5x = 90+2y$

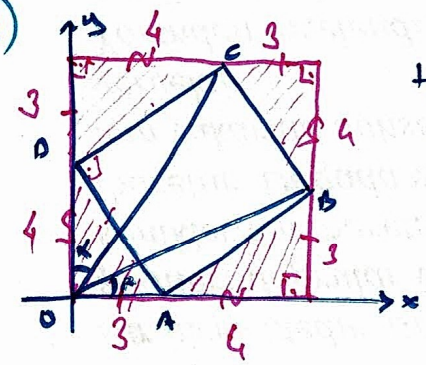
$10x = 180+6y$

$\tan 10x = \tan(180+6y)$

$= \tan 6y$

1 (B)

13)



$t_\alpha = \frac{4}{7}$

$t_\beta = \frac{3}{7}$ (A)

14) $S_{40} + C_{60}\cdot C_{40} = \frac{S_{40}\cdot S_{60} + C_{60}\cdot C_{40}}{S_{60}}$

$= \frac{C_{20}}{\frac{\sqrt{3}}{2}} = \frac{2m}{\sqrt{3}} = \frac{2\sqrt{3}m}{3}$ (D)

15) $\arctan m + \underbrace{\arcsin\frac{\sqrt{3}}{2}}_{\frac{\pi}{3}} = 0$

$\arctan m = -\frac{\pi}{3}$

$m = \tan\left(-\frac{\pi}{3}\right) = -\sqrt{3}$ (D)

$\arcsin\left(-\frac{\sqrt{3}}{2}\right) = -\arcsin\frac{\sqrt{3}}{2} = -\frac{\pi}{3}$

16) $f(x) \longrightarrow 2\cdot f(3x)$ ~~A~~ B (C) ~~D~~ ~~E~~

$\frac{\pi}{6} \to 4$