SAT Bell work Tuesday 03/06

$$\frac{8-i}{3-2i}$$

If the expression above is rewritten in the form $a+bi$, where a and b are real numbers, what is the value of a ? (Note: $i=\sqrt{-1}$)

A) 2

B) $\frac{8}{3}$

C) 3

D) $\frac{11}{3}$

FOIL

$a+bi$

$$\frac{8-i}{3-2i}\cdot\frac{3+2i}{3+2i}=\frac{24+16i-3i-2i^2}{3^2-(2i)^2}$$

$i^2=-1$, $-(2i)^2=+4$

conjugate = same real, opposite imaginary

$$=\frac{26+13i}{13}=\frac{13(2+1i)}{13}=2+1i$$

a b

Denominator

$(a-b)(a+b)=a^2-b^2$

51)

$$2\cos x\sin x-\cos x=0$$

$$2xy-x=0$$

$$x(2y-1)=0$$

$\cos x=0$

$x=\frac{\pi}{2},\frac{3\pi}{2}$

$2y-1=0$

$2\sin x-1=0$

$\sin x=\frac{1}{2}$

$x=\frac{\pi}{6},\frac{5\pi}{6}$

52)

$$\sqrt{2}\tan\cos x-\tan x=0$$

rewrite $\tan x(\sqrt{2}\cos-1)=0$

$a(\sqrt{2}b-1)=0$

$\tan x=0$

$a=0$

$\frac{\sin}{\cos}$

$0,\pi$

$\frac{\sin}{\cos}$

$\sqrt{2}\cos x-1=0$

$+1$

$\frac{1}{\sqrt{2}}\sqrt{2}\cos x=\frac{\sqrt{2}}{2}$

$\cos x=\frac{\sqrt{2}}{2}$

$\frac{\pi}{4},\frac{7\pi}{4}$

$\frac{\pi}{2}(0,1)$ $0(1,0)$ $\pi(-1,0)$ $\frac{3\pi}{2}(0,-1)$

$\frac{\pi}{4}$ $\frac{7\pi}{4}$

53. $\tan x \sin^2 x - \tan x = 0$

$\tan x(\sin^2 x - 1) = 0$ → $\sin^2 + \cos^2 = 1$, $\sin^2 - 1 = -\cos^2$

$\tan x = 0$

$x = 0$

$x = \pi$

$\frac{\sin x}{\cos x}$

$-\sqrt{\cos^2 x} = \sqrt{0}$

$-\cos x = 0$

$\frac{-\cos x}{-1} = \frac{0}{-1}$

$\cos x = 0$

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

$x = \frac{3\pi}{2}$

$\tan x \sin^2 x - \tan x = 0$

$\tan x (\sin^2 x - 1) = 0$

$\tan x = 0$

$x = 0, \pi$

$\frac{\sin x}{\cos x}$

$\sin^2 x - 1 = 0$

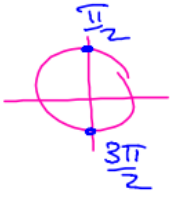
$+1 \quad +1$

$\sqrt{\sin^2 x} = \sqrt{1}$

$\pm$

$\sin x = 1$

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



$\sin x = -1$

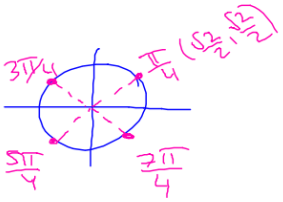
$x = \frac{3\pi}{2}$

54) $\sin x \tan^2 x = \sin x$

$-\sin x \quad -\sin x$

$\sin x \tan^2 x - \sin x = 0$

$\sin x(\tan^2 x - 1) = 0$



$\sin x = 0$

$x = \pi$

$x = 0$

$\tan^2 x - 1 = 0$

$+1 \quad +1$

$\sqrt{\tan^2 x} = \sqrt{1}$

$\pm$

$\tan x = \pm 1$

$\tan x = 1$ $x = \pi/4$ $x = 3\pi/4$

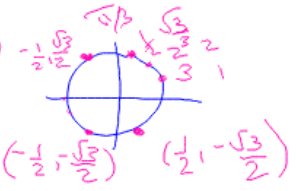
$\tan x = -1$ $x = 5\pi/4$ $x = 7\pi/4$

55. $\tan^2 x = 3$

$\sqrt{\tan^2 x} = \pm\sqrt{3}$ $\quad \tan x = \pm\sqrt{3} = \frac{\sin}{\cos}$

$\frac{\pi}{3}$ x y $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ $\quad \frac{y}{x} = \frac{\sqrt{3}}{2} \cdot \frac{2}{1} = \pm\sqrt{3}$

$x = \frac{\pi}{3}$ $\quad x = \frac{2\pi}{3}$



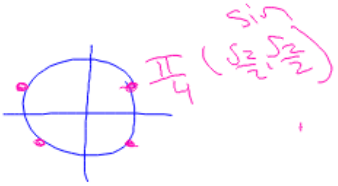
$x = \frac{4\pi}{3}$ $\quad x = \frac{5\pi}{3}$

$\frac{4\pi}{6} = \frac{2\pi}{3}$

$\frac{8\pi}{6} = \frac{4\pi}{3}$

56) $\frac{2\sin^2 x}{2} = \frac{1}{2}$

$\sqrt{\sin^2 x} = \pm\sqrt{\frac{1}{2}}$



$\sin x = \pm\frac{1 \cdot \sqrt{2}}{\sqrt{2}\sqrt{2}} = \pm\frac{\sqrt{2}}{2}$

$x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$