

Question 2: The range of the function $f(x) = 3|\sin x| - 2|\cos x|$ is

(a) $[-2, \sqrt{13}]$

(b) $[-2, 3]$

(c) $[-3, 2]$

(d) $[3, \sqrt{13}]$

Answer: (c)

Solution:

$$f(x) = 3|\sin x| - 2|\cos x|$$

If $f(x)$ is continuous function and $|\sin x|$ and $|\cos x|$ are always positive.

Find Minimum and Maximum value of $f(x)$:

$f(x)$ is minimum when $|\sin x| = 0$ and $|\cos x| = 1$

The minimum value will be $= 0 - 3 = -3$

$f(x)$ is max when $|\sin x| = 1$ and $|\cos x| = 0$

The max value will be $= 2 - 0 = 2$

The required range is $[-3, 2]$