Consider the following statments in S and R **(2000S)**

S: Both sin x and cos x are decreasing functions in the

interval $\left(\dfrac{\pi}{2}, \pi\right)$

R: If a differentiable function decreases in an interval (a, b), then its derivative also decreases in (a, b).

Which of the following is true ?

(a) Both S and R are wrong

(b) Both S and R are correct, but R is not the correct explanation of S

(c) S is correct and R is the correct explanation for S

(d) S is correct and R is wrong

SOLUTION

(d) From graph it is clear that both sin x and cos x in the interval $(\pi/2, \pi)$ are decreasing function.
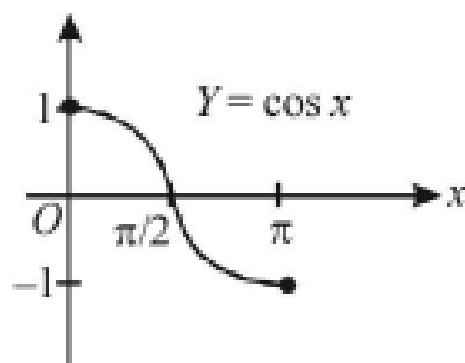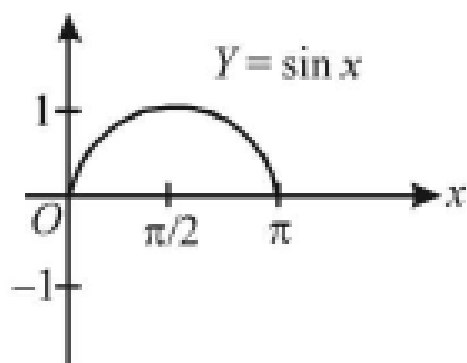
∴ S is correct.

To disprove R let us consider the counter example :

$f(x) = \sin x$ on $(0, \pi/2)$ so that $f'(x) = \cos x$

Again from graph it is clear that $f(x)$ is increasing on $(0, \pi/2)$ but $f'(x)$ is decreasing on $(0, \pi/2)$

∴ R is wrong.