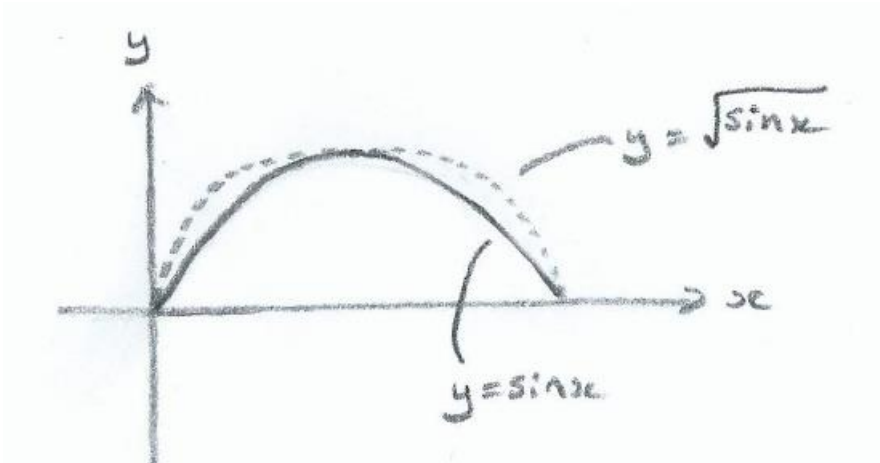


STEP/Curve Sketching Q2 (14/6/23)

Sketch (i) $y = \sqrt{\sin x}$ and (ii) $y = (\sin x)^{\frac{1}{n}}$ for large positive integer n (for $0 \leq x \leq \pi$ in both cases).

Solution



Solution

(i) Note that, for $0 < y < 1$, $\sqrt{y} > y$

So, for $y = \sqrt{\sin x}$, the graph will hug the y - axis more than for $y = \sin x$.

Also, if $f(x) = \sqrt{\sin x}$, $f'(x) = \frac{1}{2}(\sin x)^{-\frac{1}{2}} \cos x$,

so that $f'(0) = \infty$ (strictly speaking, it is 'undefined');

ie the graph is vertical at $x = 0$ (and also $x = \pi$, by symmetry).

(ii) The effect is greater for larger n , and the graph tends to a rectangular shape.