PROBLEM

If $y = ax^{n+1} + bx^{-n}$, then $x^2 \dfrac{d^2 y}{dx^2}$ is equal to
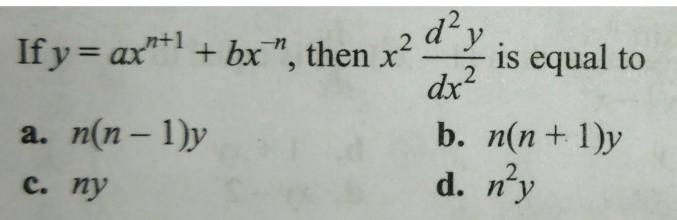
a. $n(n-1)y$

b. $n(n+1)y$

c. ny

d. $n^2 y$

SOLUTION

b. $y = ax^{n+1} + bx^{-n}$

or $\dfrac{dy}{dx} = (n+1)ax^n - nbx^{-n-1}$

or $\dfrac{d^2 y}{dx^2} = n(n+1)ax^{n-1} + n(n+1)bx^{-n-2}$

or $x^2 \dfrac{d^2 y}{dx^2} = n(n+1)y$