

$$\int_0^{\frac{1}{2}} \frac{1+\sqrt{3}}{((x+1)^2(1-x)^6)^{\frac{1}{4}}} dx$$

is

(a) 2

(b) -2

(c) 1

(d) 3

**Answer: a**

**Solution:**

$$\text{Let } I = \int_0^{1/2} [(1+\sqrt{3})/(1+x)^2(1-x)^6]^{1/4} dx$$

$$= \int_0^{1/2} (1+\sqrt{3})/(1+x)^2 [(1-x)^6/(1+x)^6]^{1/4} dx$$

$$\text{Put } (1-x)/(1+x) = t$$

$$\Rightarrow -2dx/(1+x)^2 = dt$$

$$\text{So } I = \int_1^{1/3} (1+\sqrt{3})/-2t^{6/4} dt$$

$$= [-(1+\sqrt{3})/2] \cdot 2/\sqrt{t} \Big|_1^{1/3}$$

$$= (\sqrt{3}+1)(\sqrt{3}-1)$$

$$= 2$$

Hence option a is the answer.