



30 2x15 3



$$\int_0^1 x^2 \sqrt{1-x} dx = \square$$

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$$1-x=t \text{ とおくと } x=0 \rightarrow 1 \quad t=1 \rightarrow 0$$

$$-x = t-1 \quad 2x = 1-t^2 \quad x^2 = (1-t)^2$$

$$-dx = dt \quad dx = -dt$$

より 式は

$$-\int_1^0 (1-t)^2 \sqrt{t} dt$$

$$= -\int_1^0 (1-2t+t^2) t^{\frac{1}{2}} dt$$

$$= \int_0^1 (t^{\frac{5}{2}} - 2t^{\frac{3}{2}} + t^{\frac{1}{2}}) dt$$

$$= \left[\frac{2}{7} t^{\frac{7}{2}} - \frac{4}{5} t^{\frac{5}{2}} + \frac{2}{3} t^{\frac{3}{2}} \right]_0^1$$

$$= \frac{2}{7} - \frac{4}{5} + \frac{2}{3}$$

$$= \frac{16}{105}$$

