PART E Mathematics 2

1. Find the value of $\int_0^1 \frac{3x^2+2x-1}{\sqrt{x}}\,dx$

A $\frac{16}{5}$

B $-\frac{28}{15}$

C $\frac{104}{105}$

D $\frac{8}{15}$

E $\frac{68}{15}$

Answer: **D**

We first rewrite $\sqrt{x}$ as $x^{\frac{1}{2}}$ to get $\int_0^1 3x^{\frac{3}{2}} + 2x^{\frac{1}{2}} - x^{-\frac{1}{2}}\,dx$.

We must now perform the integral and then sub in the integral bounds to find the answer:

$$\int_0^1 3x^{\frac{3}{2}} + 2x^{\frac{1}{2}} - x^{-\frac{1}{2}}\,dx = \left[\frac{6}{5}x^{\frac{5}{2}} + \frac{4}{3}x^{\frac{3}{2}} - 2x^{\frac{1}{2}}\right]_0^1 = \frac{6}{5} + \frac{4}{3} - 2 = \frac{8}{15}$$