

Show all work and circle/box your final answer. All answers must be simplified unless stated otherwise.

(1) Evaluate the following integrals:

(a) $\int \left(5 + \frac{2}{3}x^2 + \frac{3}{4}x^3 \right) dx$

(b) $\int (x+4)(2x+1) dx$

(c) $\int \frac{1 + \sqrt{x} + x}{\sqrt{x}} dx$

(d) $\int \frac{x^2 + 1}{(x^3 + 3x)^2} dx$

(e) $\int \frac{9r^2}{\sqrt{1-r^3}} dr$

(f) $\int \cot^4 x \csc^2 x dx$

(g) $\int \frac{t^2 + 2}{\sqrt{t^3 + 6t + 3}} dt$

(h) $\int x^2 \sqrt{x+1} dx$

(i) $\int \frac{x}{\sqrt{x+1}} dx$

(j) $\int \sec^3 x \tan x dx$

(2) The velocity of a particle is given by $v(t) = 3t - 6$ for $0 \leq t \leq 3$.

(a) Find the displacement over the given interval.

(b) Find the distance traveled by the particle during the given interval.