

1. Recover $f(x)$ given that $f'(x) = 2x - 3$ and $f(0) = 4$.

$$f(x) = \int (2x - 3) dx = x^2 - 3x + C. \quad +3$$

$$f(0) = 4 \Rightarrow 0^2 - 3(0) + C = 4 \Rightarrow C = 4. \quad +2$$

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Thus $f(x) = x^2 - 3x + 4$

2. Determine the indefinite integral $\int \left(\frac{3}{x^3} + 2x^{3/2} - 4 \right) dx$.

$$\int (3x^{-3} + 2x^{3/2} - 4) dx = 3 \cdot \left(\frac{x^{-2}}{-2} \right) + 2 \left(\frac{x^{5/2}}{5/2} \right) - 4x + C \quad +4$$

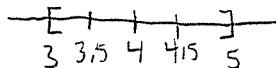
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$$= -\frac{3}{2} x^{-2} + 2 \cdot x^{5/2} \cdot \frac{2}{5} - 4x + C \quad +2$$

$$= \boxed{-\frac{3}{2x^2} + \frac{4}{5} x^{5/2} - 4x + C} \quad +1$$

3. Calculate by hand the left sum to approximate the area under the graph of $f(x) = 2x - 1$ on the interval $[3, 5]$. Do this by dividing $[3, 5]$ equally into 4 subintervals.

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$$\Delta x = \frac{5-3}{4} = \frac{1}{2} \quad +1$$

$$x_0 = 3$$

$$x_1 = 3.5 = 7/2$$

$$x_2 = 4$$

$$x_3 = 4.5 = 9/2$$

$$x_4 = 5$$

+3

$$A \approx \Delta x (f(x_0) + f(x_1) + f(x_2) + f(x_3))$$

$$= \frac{1}{2} (f(3) + f(7/2) + f(4) + f(9/2))$$

$$= \frac{1}{2} (5 + 6 + 7 + 8) = \frac{1}{2} (26) = \boxed{13} \quad +4$$