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1) Let $y = f(x) = x^2 - 5x$.

a) Evaluate dy when $x = 4, dx = \Delta x = -0.2$.

$$dy = f'(x)dx = (2x - 5)dx$$

So, when $x = 4$ and $dx = -0.2$

we have

$$dy = f'(4)(-0.2) = (2(4) - 5)(-0.2) \\ = -0.6$$

b) Evaluate Δy when $x = 4, dx = \Delta x = -0.2$.

$$\Delta y = f(4 + (-0.2)) - f(4)$$

$$= f(3.8) - f(4) = (3.8^2 - 5(3.8)) - (4^2 - 5 \cdot 4)$$

$$= -4.56 + 4 = -0.56$$

2) Find the indefinite integral.

a) $\int (e^x + e - x^3) dx$ ——— sum! \int

$$= \int e^x dx + \int e dx - \int x^3 dx$$

↑ constant! \int

$$= e^x + e \cdot x - \frac{x^{3+1}}{3+1} + C$$

$$= e^x + ex - \frac{1}{4}x^4 + C$$

b) $\int \frac{2x^3 - x + 4}{x^2} dx = \int \left(\frac{2x^3}{x^2} - \frac{x}{x^2} + \frac{4}{x^2} \right) dx$

$$= \int (2x - \frac{1}{x} + 4x^{-2}) dx$$

$$= \int 2x dx - \int \frac{1}{x} dx + \int 4x^{-2} dx$$

$$= x^2 - \ln|x| + 4 \frac{x^{-1}}{-1} + C$$

$$= x^2 - \ln|x| - 4x^{-1} + C$$