No:

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d) Based on the equation given:

$$P(X=x|s) = \begin{cases} \frac{3}{4s}\left(1-\left(\frac{x}{s}\right)^2\right) & \rightarrow \text{for } x \in (-s, s) \\ 0 & \rightarrow \text{everywhere else.} \end{cases}$$

For $P(X \leq x)$, as from $-\infty$ to $-\cancel{s}$ the function is equivalent to 0

then for $P(X \leq x)$ we basically have to search from $-s$ up to x.

$$\int_{-s}^{x} \frac{3}{4s}\left(1-\left(\frac{x}{s}\right)^2\right)dx = \frac{3}{4s} \cdot \int_{-s}^{x} \left(1-\left(\frac{x}{s}\right)^2\right)dx$$

$$= \frac{3}{4s} \cdot \int_{-s}^{x} 1\,dx - \int_{-s}^{x} \left(\frac{x}{s}\right)^2 dx$$

$$= \frac{3}{4s} \cdot [x]_{-s}^{x} - \frac{1}{s^2} \cdot \int_{-s}^{x} (x)^2 dx$$

$$= \frac{3}{4s} \cdot \left((x+s) - \frac{1}{s^2}\left(\frac{1}{3}x^3\right)_{-s}^{x}\right)$$

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

$$= \frac{3}{4s}x + \frac{3}{4} - \frac{x^3+s^3}{4s^3}$$

e) $$E(\text{abs}(x)) = \int_{-s}^{s} \left|\frac{3}{4s}\left(1-\left(\frac{x}{s}\right)^2\right)\right| dx$$

$$= \int_{-s}^{0} \frac{3}{4s}\left(1-\left(\frac{x}{s}\right)^2\right)dx + \int_{0}^{s} \frac{3}{4s}\left(1-\left(\frac{x}{s}\right)^2\right)dx$$

$$= \frac{3}{4s}\int_{-s}^{0} 1\,dx - \int_{-s}^{0}\left(\frac{x}{s}\right)^2 dx + \frac{3}{4s}\int_{0}^{s} 1\,dx - \int_{0}^{s}\left(\frac{x}{s}\right)^2 dx$$

$$= \frac{3}{4s}\left(x]_{-s}^{0} - \frac{1}{s^2}\left(\frac{1}{3}x^3\right)_{-s}^{0}\right] + \frac{3}{4s}\left(x]_{0}^{s} - \frac{1}{s^2}\left(\frac{1}{3}x^3\right)_{0}^{s}\right)$$

$$= \frac{3}{4}s\left(s - \frac{1}{s^2}\left(\frac{s^3}{3}\right)\right) + \frac{3}{4}s\left(\cancel{s} - \frac{1}{s^2}\left(\frac{1}{3}s^3\right)\right)$$

$$= 0.5 + 0.5$$

$$= 1$$