Integration with Delta Functions

Quiz: Compute

$$\int_{0^-}^{10} 5\delta(t+1) + 3\delta(t) + t^2\delta(t-5) + t\delta(t-20)\, dt.$$

Choices:

a) 0

b) 25

c) 28

d) 33

e) 48

f) 53

g) none of these

Answer: (c) 28.
The interval of integration contains 0 and 5, but not -1 or 20. So, only the $\delta(t)$ and $\delta(t-5)$ terms contribute to the integral. Their contributions are 3 and 25 (t^2 evaluated at 5).

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