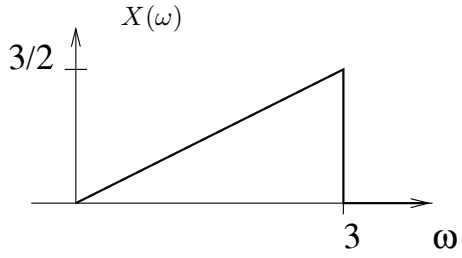
1. (20 points)
A signal $x(t)$ has the following spectrum.



- [10 points] Determine the energy of the signal $x(t)$.

$X(\omega) = (\omega/2)\,\mathrm{rect}(\omega/3 - 1/2)$. $E = \frac{1}{2\pi}\int_{-\infty}^{\infty} |X(\omega)|^2\, d\omega = \frac{1}{2\pi}\int_0^3 (\omega/2)^2\, d\omega = \boxed{\frac{9}{8\pi}}$ *[?]* *(HW 7.4)*

- [10 points] Carefully sketch the spectrum of the signal $y(t) = \delta(t) + x(-2t)$.

$Y(\omega) = 1 + \frac{1}{2}X(-\omega/2) = \begin{cases} 1 - \omega/8, & -6 < \omega < 0 \\ 1, & \text{otherwise.} \end{cases}$ ***(Picture)***

[? correct.Many forgot to add 1 everywhere to spectrum.] *(HW 6.2)*