

$$1) x(t) = 2\text{sinc}(3t)$$

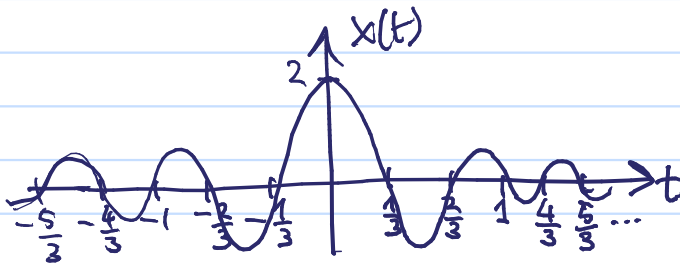
a. Energy, aperiodic, deterministic, continuous-time

$$b. E_x = \int_{-\infty}^{+\infty} (2\text{sinc}(3t))^2 dt = 4 \int_{-\infty}^{+\infty} (\text{sinc}(3t))^2 dt$$

$$= 4 \cdot \frac{1}{3} = \frac{4}{3}$$

as seen in class

c.



MATLAB code:

$T_s = 0.01$; no good choice

$t = [-5/3 : T_s : 5/3]$.

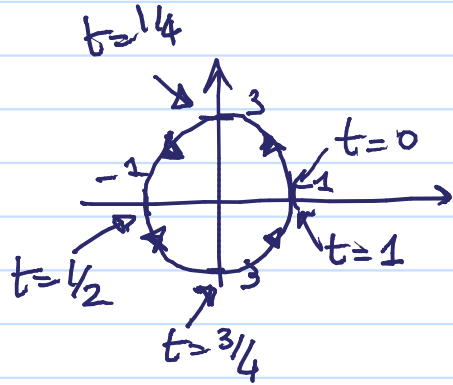
$x = 2 \cdot \sin(\pi * 3 * t) ./ (\pi * 3 * t)$;

$x(t=0) = 2$;

$\text{plot}(t, x)$;

2. a. MATLAB code:

```
t = [0:0.01:1];  
x = cos(2*pi*t);  
y = 3*sin(2*pi*t);  
plot(x, y);
```



$$\begin{aligned} \text{b. } \alpha(t) &= \sqrt{x(t)^2 + y(t)^2} \\ &= \sqrt{\cos(2\pi t)^2 + 9\sin(2\pi t)^2} \\ &= \sqrt{1 + 8\sin(2\pi t)^2} \end{aligned}$$

c. MATLAB code:

```
plot(t, sqrt(1 + 8 * sin(2 * pi * t).^2));
```