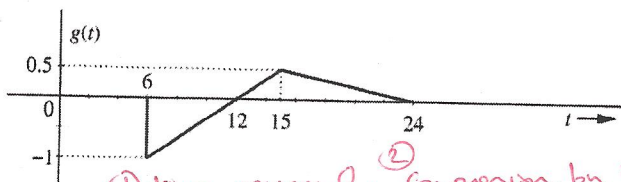


Name: KEY

ver.1

For the signal  $g(t)$  shown in the figure, sketch the signal  $4g(-2t)$  (4 points)

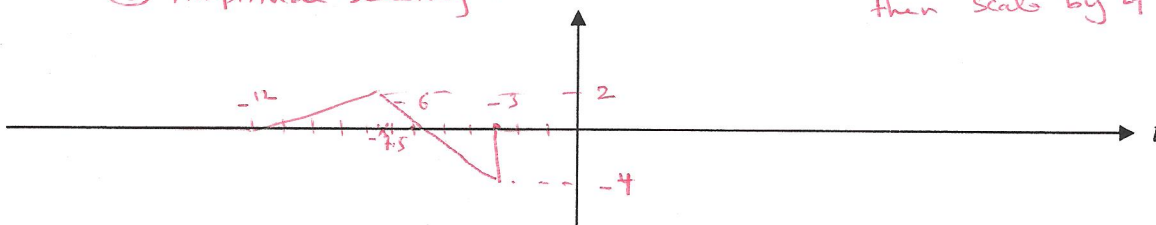


$$\tau = -2t \Rightarrow t = -\frac{\tau}{2}$$

$\tau$	6	12	15	24
$t$	-3	-6	-7.5	-12

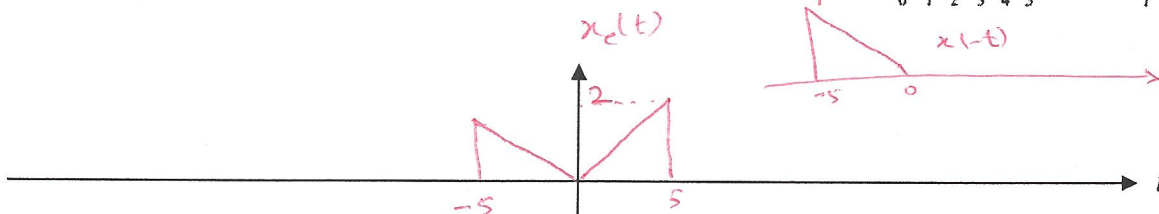
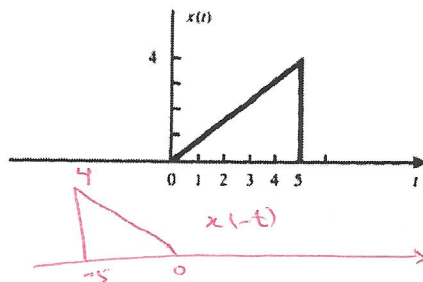
- ① time reversal, ② compression by factor of 2  
 ③ Amplitude scaling.

then scale by 4

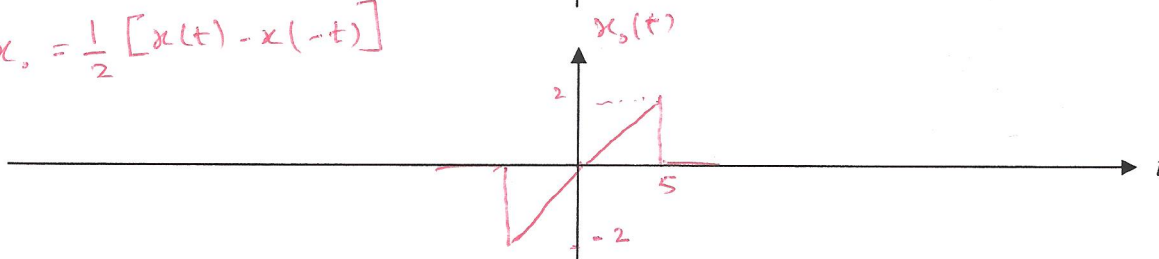


Sketch and label the even and odd components of the signals shown (4 points)

$$x_e = \frac{1}{2} [x(t) + x(-t)]$$



$$x_o = \frac{1}{2} [x(t) - x(-t)]$$



If we add a periodic signal of frequency  $f_1 = \pi$  and another signal of  $f_2 = 2\pi$ , is the sum going to be periodic? what is the frequency of the resultant signal? (2 points)

periodic, because the ratio is ~~integer~~ rational.

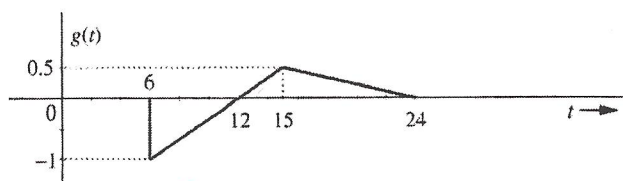
$$f_1/f_2 = \frac{\pi}{2\pi} = \frac{1}{2}$$

is Greatest Common divide  
 $\pi$   $\pi$   $\pi$   
 $T = \pi \text{ Hz}$

Name: **KEY**

ver.2

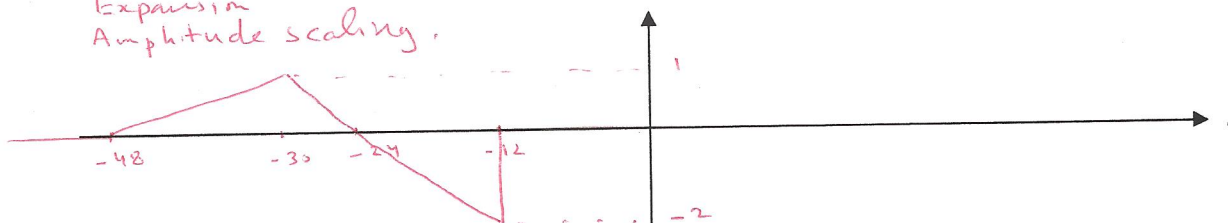
For the signal  $g(t)$  shown in the figure, sketch the signal  $2g(-\frac{t}{2})$  (4 points)



$$\tau = -\frac{t}{2} \Rightarrow t = -2\tau$$

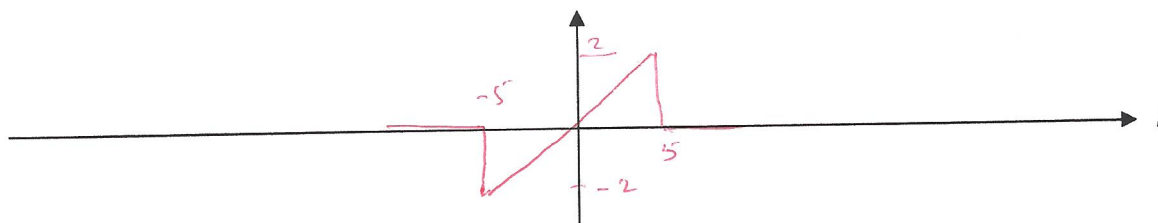
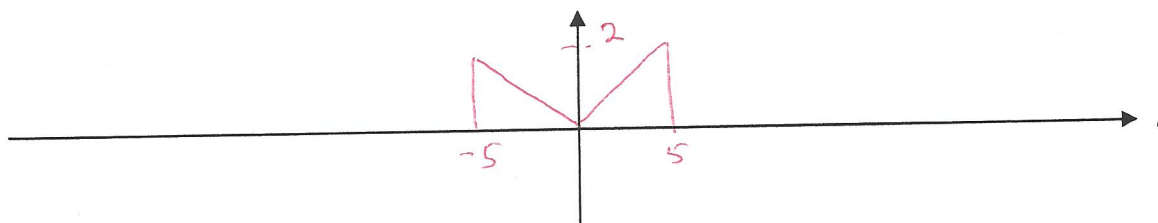
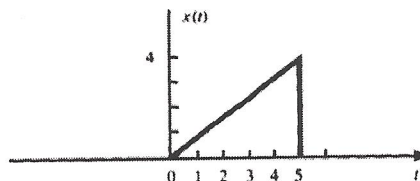
$\tau$	6	12	15	24
$t$	-12	-24	-30	-48

Time reversal.  
 Expansion  
 Amplitude scaling.



Sketch and label the even and odd components of the signals shown (4 points)

$$x_e = \frac{1}{2} [x(t) + x(-t)]$$



If we add a periodic signal of frequency  $f_1 = 1$  and another signal of  $f_2 = 2.25$ , is the sum going to be periodic? what is the frequency of the resultant signal? (2 points)

periodic.  $\text{freq.} = 0.25 \text{ Hz}$  Greatest Common divider.