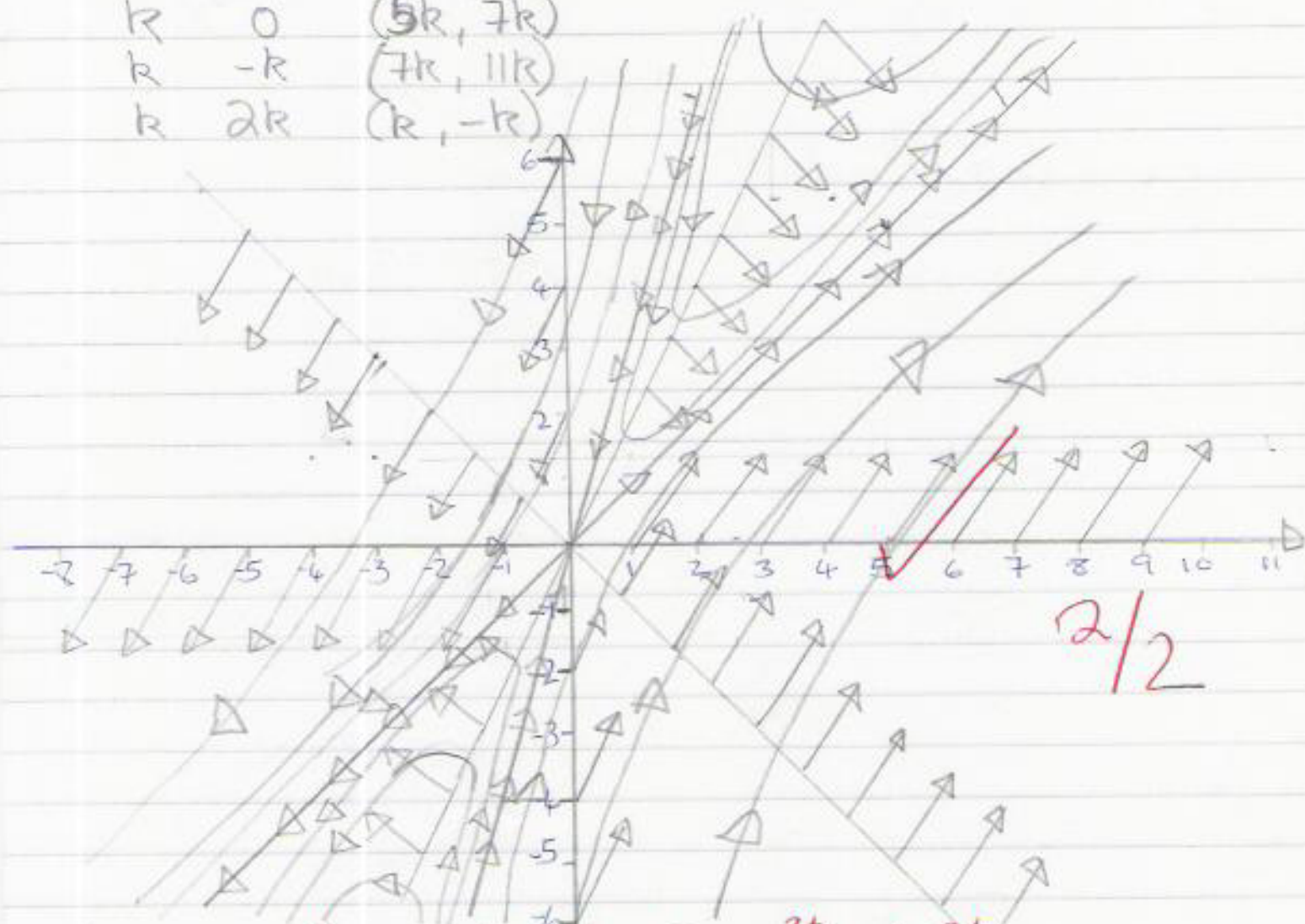


d) Find the flow lines on $x=0, y=0, y=-x, y=2x$

x	y	$V(x, y)$
0	k	$(-2k, -4k)$
k	0	$(5k, 7k)$
k	$-k$	$(7k, 11k)$
k	$2k$	$(k, -k)$



e) The general solution is $ce^{3t} + de^{-2t}$. The eigenvalues are $\lambda=3, \lambda=-2$. Hence the solutions to the differential equations of order 2 for the flow functions are

$$f(t) = c_1 e^{3t} + d_1 e^{-2t}$$

$$g(t) = c_2 e^{3t} + d_2 e^{-2t}$$

The flow functions f and g also satisfy

$$f'(t) = a f(t) + b g(t) \quad (1)$$

$$g'(t) = c f(t) + d g(t) \quad (2)$$

$$f'(t) = \frac{d}{dt} (c_1 e^{3t} + d_1 e^{-2t}) = 3c_1 e^{3t} - 2d_1 e^{-2t} \quad 4/4$$