

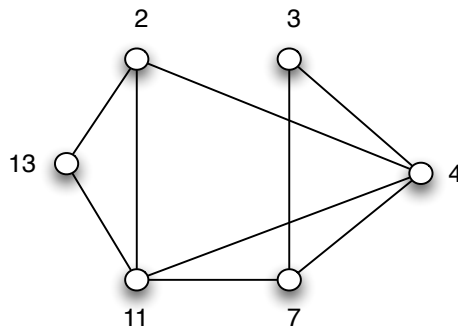
► **Exercise 9-1**

Let  $S = \{2, 3, 4, 7, 11, 13\}$ . Draw the graph  $G$  whose vertex set is  $S$  and such that  $(i, j)$  is an edge of  $G$  for  $i, j \in S$  if  $i + j \in S$  or  $|i - j| \in S$ .

**Solution.** In the following table, we show all values of  $i + j$  and  $|i - j|$  for  $i, j \in S$ , where the value written by RED font indicates that the value is in  $S$ .

$(i, j)$	$i + j$	$ i - j $
(2,3)	5	1
(2,4)	6	2
(2,7)	9	5
(2,11)	13	9
(2,13)	15	11
(3,4)	7	1
(3,7)	10	4
(3,11)	14	8
(3,13)	16	10
(4,7)	11	3
(4,11)	15	7
(4,13)	17	9
(7,11)	18	4
(7,13)	20	6
(11,13)	24	2

From this table, we can see that  $G$  contains 6 vertices and 9 edges, which is as shown in the following figure.



□