## Exercise 24

Table 6 shows the year and the number of people unemployed in a particular city for several years. Determine whether the trend appears linear. If so, and assuming the trend continues, in what year will the number of unemployed reach 5?

Year	Number Unemployed
1990	750
1992	670
1994	650
1996	605
1998	550
2000	510
2002	460
2004	420
2006	380
2008	320

Table 6

Solution

Plot the following points on a graph: $(1990, 750)$, $(1992, 670)$, $(1994, 650)$, $(1996, 605)$, $(1998, 550)$, $(2000, 510)$, $(2002, 460)$, $(2004, 420)$, $(2006, 380)$, and $(2008, 320)$.
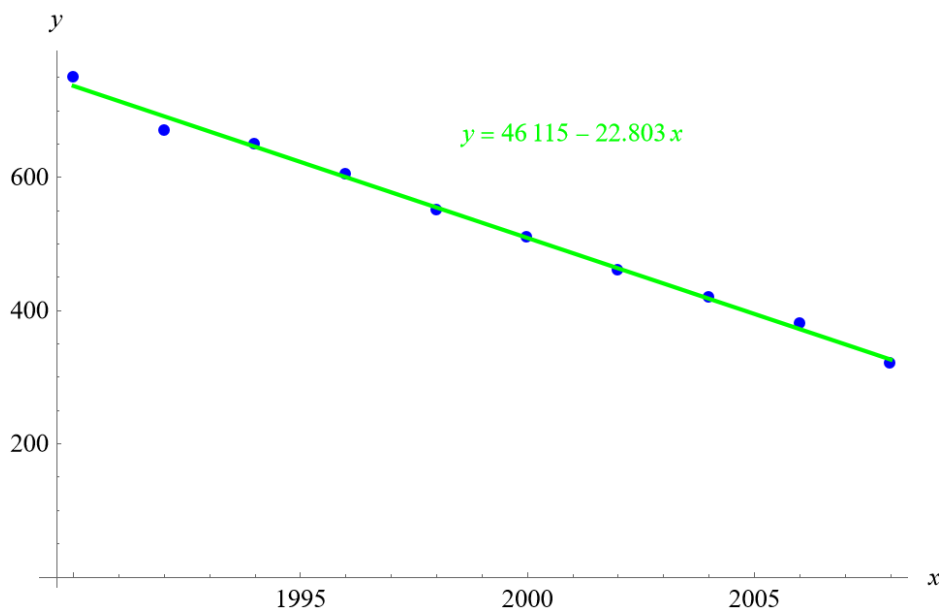
$y = 46\,115 - 22.803\,x$

The trend does appear linear. Mathematica's FindFit function gives

$$y = 46\,115 - 22.803x$$

as the line that best fits the data. Find when the number of unemployed reaches 5 by solving the following equation.

$$y = 5$$

$$46\,115 - 22.803x = 5$$

$$-22.803x = 5 - 46\,115$$

$$-22.803x = -46\,110$$

$$x > \frac{46\,110}{22.803} \approx 2022.1$$

Therefore, after 2022 starts the number of unemployed people will be 5.