Problem of the Week
Problem B and Solution

Double Trouble

Problem

Riley Waters has decided to join Facebook^{TM}. A week after posting his profile, he discovers he has two friends! After another week, his number of friends has doubled to four. At he end of the third week, his total number of friends has doubled yet again to 8.

a) If his number of friends continue to double each week, how many friends will Riley have at the end of 6 weeks? Create a T-chart to show your calculations.

b) Continue your chart to show how many friends Riley would have after 10 weeks.

c) How long would it be until Riley has more than 15 000 friends?

d) There are about 34 million people in Canada. How long will it be until Riley is friends with at least that many people?

Solution

a)

Weeks	Friends
1	2
2	4
3	8
4	16
5	32
6	64

b)

Weeks	Friends
7	128
8	256
9	512
10	1 024

c)

Weeks	Friends
11	2 048
12	4 096
13	8 192
14	16 384

From the tables, a) Ryan will have 64 friends after 6 weeks, b) 1 024 friends after 10 weeks, and c) he will have more than 15 000 friends after 14 weeks.

d) Using a calculator reveals that Ryan has 33 554 432 friends after 25 weeks, and 67 108 864 after 26 weeks. (Entering 2 ×2 and repeatedly pressing the "=" sign on some calculators may help.)