Present Value of a Lottery Ticket
Notes on Solution

1 Ten equal installments

Brute force calculation, assuming that the first payment arrives this year.

int 5%

year	pmt	pv
0	100	100
1	100	95.2
2	100	90.7
3	100	86.4
4	100	82.3
5	100	78.4
6	100	74.6
7	100	71.1
8	100	67.7
9	100	64.5
sum		810.8

Alternative approach: PV is year 0 payment plus the value of an infinite stream minus the value of losing an infinite stream after year 9:

year 0	100
infinite	2000
after 9	-1289
total	810.8

2 PV of 50,000 a year forever?

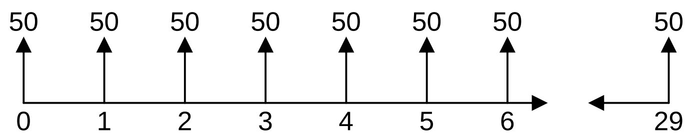
If the payments start in one year, the value would be 50,000/0.05 which is equal to 1,000,000 .

That's clearly better than the deal in part 1. If the payments start right away, it would be even better: $1,050,000.

3 PV of 30 years worth of payments

assume that payments begin right away (year 0) and end after year 29 (the 30th payment)

each payment	50,000



pv at 0 of an infinite stream starting in year 1	1,000,000
pv of year 0 payment	50,000
pv at 0 of stream from 30 onward	242,946
pv of pmts from 0 to 29	807,054

The first alternative, $100,000 a year for 10 years, is slightly better than receiving $50,000 a year for 30 years.