

Lotto. = winnings.

I win a lotto. I can take the prize in 2 ways.

1. € 40,000 a year paid at start of year for 25 years. AER is 3%.

2. A lump sum now.

What should the lump sum be to have same value as option 1.

$$P = 40000 + \frac{40000}{1.03} + \frac{40000}{1.03}$$

$$a = 40000 \quad r = \frac{1}{1.03} \quad n = 25$$

$$S_n = \frac{a(1-r^n)}{1-r} = \frac{40000 \left(1 - \left(\frac{1}{1.03}\right)^{25}\right)}{1 - \frac{1}{1.03}} = € 717,421.68$$

A lotto has 2 options.

(i) A lump sum of € 300,000.

(ii) Equal instalments of € x paid out at start of year for 10 years. AER is 2%. Find x if option 2 is equal in value to option 1.

$$P = 300,000$$

$$300000 = F + \frac{F}{1.02} + \dots$$

$$a = 1 \quad r = \frac{1}{1.02} \quad n = 10$$

$$S_n = \frac{a(1-r^n)}{1-r} = \frac{1 - \left(\frac{1}{1.02}\right)^{10}}{1 - \frac{1}{1.02}} = 9.16 F$$

$$F = \frac{300000}{9.16} = € 32,743.10$$