SUPERANNUATION

Example: Mickey pays $1000 into a superannuation fund at the beginning of each year. If the interest rate is 8% compounded annually, what will Mickey's superannuation be worth after 20 years.

Answer: The first $1000 earns 8% compound interest for 20 years, the second $1000 earns 8% compound interest for 19 years and so on.

By applying the formula; $A = P(1 + \dfrac{r}{100})^n$

The first $1000 is worth $1000(1.08)^{20}$

The second $1000 is worth $1000(1.08)^{19}$ ....

The twentieth $1000 is worth $1000(1.08)^{1}$

Adding these gives: $A = 1000(1.08 + 1.08^2 + ...+ 1.08^{19} + 1.08^{20})$

The brackets represent a G.P. with a = 1.08 and r = 1.08

$$S_n = \frac{a(r^n - 1)}{r-1} \qquad A = 1000\left[\frac{1.08(1.08^{20} - 1)}{1.08 - 1}\right] = 1000\left[\frac{3.953833715}{0.08}\right]$$

= $49 422.92 (to nearest cent)

Exercise:

Q.1.   Shafia invested $1000 in a superannuation fund at the beginning of each year for 10 years at an interest rate of 6% per annum, compounded annually. What was her investment worth at the end of 10 years?

Q.2.   Mugsey invested $1000 in a superannuation fund at the beginning of each year for 10 years at an interest rate of 6% per annum, compounded monthly. What was his investment worth at the end of 10 years?

Q.3.   Juan paid $6000 into a superannuation fund every year. Interest was 9% per annum, compounded annually. What was his superannuation worth when he retired after 40 years?

Q.4.   Shakeeba paid $500 into a superannuation fund every month. Interest was 9% per annum, compounded monthly. What was her superannuation worth when she retired after 40 years?

Q.5.   Amanda paid $100 per week into a superannuation fund. The interest rate was 10.4% per annum, compounded weekly. After 10 years Amanda transferred her superannuation to a new fund because she changed jobs. How much superannuation did Amanda transfer?

Q.6.   Wafaa paid $800 per month into a superannuation fund for 15 years. The interest rate was 8% per annum, compounded monthly. After 15 years, Wafaa left her job and didn't make any more payments to her superannuation, but had to wait a further 20 years before she could collect her superannuation. What was Wafaa's superannuation worth at the end of the 35 years?

Answers:
Q.1. $1397.64   Q.2. $14 104.51   Q3. $2 209 751.19
Q.4. $2 358 215.09   Q.5. $91 496.63   Q.6. $1 372 981.94