

Super Activity 4: How do I choose a super fund?

Years 11-12

TASK 3

SUPERANNUATION AND INFLATION: A DOLLAR TODAY OR IN 45 YEARS?

Worksheet

Focus: Mathematics

YOU WILL:

- ▶ investigate the impact of inflation on superannuation

YOU WILL NEED:

- ▶ *Fact sheet: What is superannuation*
- ▶ *Fact sheet: Where does my super money come from?*
- ▶ Graph paper or graphing software (Excel, Geogebra, Desmos, etc)
- ▶ A scientific or financial calculator

Inflation is the increase in the cost of goods and services over time. It is usually calculated as a percentage increase in the cost of a standard basket of goods and services.

1. Use the data in the following table to plot the calendar year inflation rates from 1970 to 2015.

Table 1. Annual inflation rates

1970	1975	1980	1985	1990	1995	2000	2005	2010	2015
6.1	13.3	9.5	9.1	3.2	2.6	4.4	3.6	3.3	1.3

Source: Reserve Bank of Australia Inflation calculator (Calendar year)

2. From your graph, what is the highest inflation rate plotted in this period? Do you think this was the highest inflation rate recorded in Australia over this period? Justify your answer.
3. The Australian inflation rate based on consumer prices is calculated each quarter of the year. In one calendar year the quarterly inflation rates were 16.7%, 17.7%, 17% and 12%. What was the arithmetic mean of the inflation rate for that year? Provide four different quarterly inflation rates that would have the same mean inflation rate.
4. The equivalent value of “a basket of goods and services” valued at \$1,000 in 1970 was approximately \$11,000 in 2015.
 - a. Use the compound interest formula $A = P(1 + r)^n$ where $n = 45$ to show this corresponds to an approximate annual average inflation rate of 5.5 per cent. Add a horizontal line at 5.5 per cent inflation from 1970 to 2015 on your graph of inflation. Write a brief description of the variation from the average inflation of 5.5 per cent over this time.
 - b. In December 2015, the Association of Superannuation Funds of Australia (ASFA) published that average super balances at retirement were \$355,000 for households. What would have been the approximate value of the super balance for households in 1970 dollars?
 - c. Using an average annual inflation rate of 3 per cent for the next 45 years what would the inflated dollar value of \$355,000 be in 45 years?
 - d. Using an average annual inflation rate of 3 per cent, determine how many years it will take for savings of \$355,000 to have half as much purchasing power.

5. In May 2017 the mean full-time adult weekly earnings was approximately \$1,543 (Source: Australian Bureau of Statistics 6302.0). The minimum amount of superannuation an employer must pay on your behalf, known as the Superannuation Guarantee Contribution rate, is currently 9.5%. How much must an employer pay under the superannuation guarantee for 12 weeks for an employee who earns \$1,543 per week?
6. The future value of a series of regular equal deposits of money can be thought of as the sum of a number of compound interest investments.
- If \$P is paid into a superannuation fund and left to accumulate interest of $i\%$ per month for n months, write an algebraic expression for the value of the initial investment after n months.
 - If the next month another \$P is paid into a superannuation fund and left to accumulate interest, it will be invested for one month less, $(n - 1)$ months. After \$P has been invested at the start of each month at $i\%$ interest, show that the value of the total investment at the end of n months will be $P(1 + i)^n + P(1 + i)^{n-1} + \dots + P(1 + i)^3 + P(1 + i)^2 + P(1 + i)$
 - Use the result for the sum of a geometric series to show that the final value of investing \$P each month for n months at $i\%$ interest per month is $\frac{P(1 + i)[(1 + i)^n - 1]}{i}$.

When the payment is made at the beginning of a period this result for the future value of the investment is sometimes described as the future value annuity-due.