

**WORK SHEET***The Value of Compounding*

**THIS ACTIVITY** shows the power of compounding money annually for 46 years. It allows you to examine returns on different investment options and the impact of inflation on these investments.

Will starting out at minimum wage enable you to save enough to retire with \$1 million by age 67? How can you protect your savings against inflation or stock-market declines? After completing this spreadsheet, discuss the differences by age 67 for each category. What is the impact of inflation?

Change the numbers in the absolute-value cells and discuss these “what if” scenarios: What if your savings-account interest rate is 3.25%? Inflation rises to 6%?

**1** Make the header **The Retired Millionaire’s Club**.

**2** Set up an area for information that will be *absolute cell references*. This allows you to do “what if” scenarios later. In each of the following cells place these labels:

- A1** Retirement Income Absolute Cell References
- A2** Percentage annual raise
- A3** Percentage contribution of salary
- A4** Savings-account interest rate
- A5** Returns on Treasury securities
- A6** Returns on stock-market investments
- A7** Inflation rate
- A8** Starting salary

**3** Enter these values in column B. *Make sure to enter all data in the appropriate number format:*

- B2** 3.0%   **B3** 4.0%   **B4** 3.5%
- B5** 5.0%   **B6** 10%   **B7** 3.0%   **B8** \$11,000

**4** Place the following labels in these cells:

- C9** Annual   **D9** Retirement   **E9** Savings
- F9** Impact of   **G9** Treasury   **H9** Impact of
- I9** Stock   **J9** Impact of   **B10** Age   **C10** Salary
- D10** Contribution   **E10** Account   **F10** Inflation
- G10** Securities   **H10** Inflation   **I10** Market
- J10** Inflation

**5** Go to **B11** and type in 21.

Use the spreadsheet’s *block* or *extend* function to highlight **B11** through **B57**. Use the *fill series* function so the spreadsheet will put in all the ages until age 67.

**6** Here are the formulas for your calculations:

- Annual Salary

In cell **C11** type the following formula =B8.

We want the subsequent annual salaries to reflect the percentage annual raise in **B2**. So in **C12** enter = (C11 \* \$B\$2) + C11. The \$ symbol indicates an absolute cell reference to the percentage in column B row 2.

Next, extend from **C12** to **C57**, and use the *fill down* function to copy the formula down.

- Retirement Contribution

Go to cell **D11** and enter the formula = \$B\$3 \* C11. This formula multiplies the percentage in **B3** with the annual salary for each year.

Extend from **D11** to **D57** and *fill down*.

- Savings Account

Go to **E11** and enter =D11 \* (1+\$B\$4). This is the amount that would be in your savings account at the end of age 21.

Next, go to **E12** and enter = (E11+D12) \* (1+\$B\$4). This formula adds last year’s savings account total to this year’s contribution and gives you a new balance.

*Fill down* the formula from **E12** to **E57**.

- Impact of Inflation on Savings Accounts

In **F11** enter =D11 \* (1+(\$B\$4-\$B\$7))

In **F12** enter = (F11+D12) \* (1+(\$B\$4-\$B\$7))

Extend from **F12** to **F57** and *fill down*.

- Treasury Securities

In **G11** enter =D11 \* (1+\$B\$5)

In **G12** enter = (G11+D12) \* (1+\$B\$5)

Extend from **G12** to **G57** and *fill down*.

- Impact of Inflation on Treasury Securities

In **H11** enter =D11 \* (1+(\$B\$5-\$B\$7))

In **H12** enter = (H11+D12) \* (1+(\$B\$5-\$B\$7))

Extend from **H12** to **H57** and *fill down*.

- Stock Market

In **I11** enter =D11 \* (1+\$B\$6)

In **I12** enter = (I11+D12) \* (1+\$B\$6)

Extend from **I12** to **I57** and *fill down*.

- Impact of Inflation on the Stock Market

In **J11** enter =D11 \* (1+(\$B\$6-\$B\$7))

In **J12** enter = (J11+D12) \* (1+(\$B\$6-\$B\$7))

Extend from **J12** to **J57** and *fill down*.

Retirement Income Absolute Cell References		The Retired Millionaire's club							
Percentage Annual Raise	3%								
Percentage contribution of Salary	4%								
Savings account interest rate	3.50%								
Returns on treasury securities	5%								
Returns on stock market investments	10.00%								
Inflation rate	3%								
Starting salary	\$11,000								
		Annual	Retirement	Savings	Impact of	Treasury	Impact of	Stock	Impact of
	Age	Salary	contribution	account	Inflation	Securities	Inflation	Market	Inflation
	21	\$11,000	\$440	\$455	\$442	\$462	\$449	\$484	\$471
	22	\$11,330	\$453	\$940	\$900	\$961	\$920	\$1,031	\$989
	23	\$11,670	\$467	\$1,456	\$1,374	\$1,499	\$1,415	\$1,647	\$1,557
	24	\$12,020	\$481	\$2,005	\$1,864	\$2,079	\$1,933	\$2,341	\$2,181
	25	\$12,381	\$495	\$2,588	\$2,371	\$2,703	\$2,477	\$3,120	\$2,863
	26	\$12,752	\$510	\$3,206	\$2,895	\$3,374	\$3,047	\$3,993	\$3,610
	27	\$13,135	\$525	\$3,862	\$3,438	\$4,094	\$3,644	\$4,970	\$4,424
	28	\$13,529	\$541	\$4,558	\$3,999	\$4,867	\$4,269	\$6,063	\$5,313
	29	\$13,934	\$557	\$5,294	\$4,579	\$5,695	\$4,922	\$7,282	\$6,281
	30	\$14,353	\$574	\$6,073	\$5,179	\$6,583	\$5,606	\$8,642	\$7,335
	31	\$14,783	\$591	\$6,898	\$5,799	\$7,533	\$6,322	\$10,156	\$8,482
	32	\$15,227	\$609	\$7,770	\$6,440	\$8,549	\$7,069	\$11,842	\$9,727
	33	\$15,683	\$627	\$8,691	\$7,103	\$9,635	\$7,851	\$13,716	\$11,079
	34	\$16,154	\$646	\$9,664	\$7,787	\$10,796	\$8,667	\$15,799	\$12,546
	35	\$16,638	\$666	\$10,691	\$8,495	\$12,034	\$9,519	\$18,110	\$14,137
	36	\$17,138	\$686	\$11,775	\$9,227	\$13,356	\$10,409	\$20,676	\$15,860
	37	\$17,652	\$706	\$12,918	\$9,982	\$14,765	\$11,337	\$23,520	\$17,725
	38	\$18,181	\$727	\$14,123	\$10,763	\$16,267	\$12,306	\$26,672	\$19,744
	39	\$18,727	\$749	\$15,392	\$11,570	\$17,867	\$13,316	\$30,163	\$21,928
	40	\$19,289	\$772	\$16,729	\$12,403	\$19,570	\$14,369	\$34,028	\$24,288
	41	\$19,867	\$795	\$18,137	\$13,264	\$21,383	\$15,467	\$38,305	\$26,839
	42	\$20,463	\$819	\$19,619	\$14,153	\$23,312	\$16,611	\$43,036	\$29,593
	43	\$21,077	\$843	\$21,179	\$15,071	\$25,362	\$17,803	\$48,267	\$32,567
	44	\$21,709	\$868	\$22,819	\$16,019	\$27,542	\$19,045	\$54,049	\$35,776
	45	\$22,361	\$894	\$24,543	\$16,998	\$29,859	\$20,338	\$60,437	\$39,237
	46	\$23,032	\$921	\$26,356	\$18,009	\$32,319	\$21,685	\$67,494	\$42,969
	47	\$23,723	\$949	\$28,260	\$19,052	\$34,931	\$23,086	\$75,288	\$46,993
	48	\$24,434	\$977	\$30,261	\$20,130	\$37,704	\$24,545	\$83,891	\$51,328
	49	\$25,167	\$1,007	\$32,362	\$21,242	\$40,646	\$26,063	\$93,388	\$55,998
	50	\$25,922	\$1,037	\$34,568	\$22,391	\$43,767	\$27,642	\$103,867	\$61,027
	51	\$26,700	\$1,068	\$36,883	\$23,576	\$47,077	\$29,284	\$115,429	\$66,442
	52	\$27,501	\$1,100	\$39,312	\$24,799	\$50,586	\$30,992	\$128,182	\$72,270
	53	\$28,326	\$1,133	\$41,861	\$26,062	\$54,305	\$32,767	\$142,246	\$78,541
	54	\$29,176	\$1,167	\$44,534	\$27,365	\$58,245	\$34,613	\$157,755	\$85,288
	55	\$30,051	\$1,202	\$47,337	\$28,710	\$62,420	\$36,531	\$174,852	\$92,544
	56	\$30,952	\$1,238	\$50,275	\$30,098	\$66,841	\$38,525	\$193,700	\$100,347
	57	\$31,881	\$1,275	\$53,355	\$31,530	\$71,522	\$40,596	\$214,472	\$108,736
	58	\$32,837	\$1,313	\$56,581	\$33,008	\$76,477	\$42,748	\$237,364	\$117,753
	59	\$33,823	\$1,353	\$59,962	\$34,532	\$81,721	\$44,982	\$262,589	\$127,443
	60	\$34,837	\$1,393	\$63,503	\$36,106	\$87,271	\$47,303	\$290,381	\$137,855
	61	\$35,882	\$1,435	\$67,211	\$37,729	\$93,141	\$49,714	\$320,998	\$149,041
	62	\$36,959	\$1,478	\$71,094	\$39,403	\$99,351	\$52,216	\$354,724	\$161,056
	63	\$38,068	\$1,523	\$75,158	\$41,130	\$105,917	\$54,813	\$391,871	\$173,959
	64	\$39,210	\$1,568	\$79,412	\$42,912	\$112,860	\$57,509	\$432,783	\$187,814
	65	\$40,386	\$1,615	\$83,863	\$44,750	\$120,199	\$60,307	\$477,839	\$202,689
	66	\$41,598	\$1,664	\$88,520	\$46,646	\$127,956	\$63,210	\$527,453	\$218,658
	67	\$42,845	\$1,714	\$93,392	\$48,602	\$136,153	\$66,223	\$582,083	\$235,798