

Practice Quiz 5: Planning for Retirement (Solutions)

1. Mary is saving to make a 20% down payment on a house \$150,000 in 8 years. The down payment will be \$30,000 and she can earn a 4% interest on her savings. If she sets aside a fixed amount at the end of each year, how much must she set aside at the end of each year to meet the down payment? If she sets aside a fixed amount at the end of each month, how much must she set aside at the end of each month to meet the down payment?

Ans. The amount she must set aside at the end of each year can be found using a financial calculator:

| <i>Time Value of Money</i> | |
|----------------------------|-------------|
| P/Y | 1 |
| PV | \$0 |
| FV | \$30,000 |
| I/Y | 4% |
| N | 8 |
| <hr/> | |
| PMT= | -\$3,255.83 |

The amount she must set aside at the end of each month is:

| <i>Time Value of Money</i> | |
|----------------------------|-----------|
| P/Y | 12 |
| PV | \$0 |
| FV | \$30,000 |
| N | 96 |
| I/Y | 4% |
| <hr/> | |
| PMT = | -\$265.68 |

2. A man is saving for his daughter's college education. He expects to earn an average return of 8% on his investment account and will need \$120,000 in 15 years. He plans to meet this goal by setting aside the same amount at the beginning of each year for the next 15 years. What amount must he set aside each year to meet this commitment?

Ans. This can be solved using a financial calculator:

| <u>Time Value of Money</u> | |
|----------------------------|-------------|
| BGN | BGN |
| P/Y | 1 |
| PV | \$0 |
| FV | \$120,000 |
| I/Y | 8% |
| N | 15 |
| <hr/> | |
| PMT= | -\$4,092.17 |

3. Today is the first day of Mr. McGinty's retirement. He currently has \$950,000 in his retirement account, which he expects can earn an annual return of 4%. If he withdraws the same amount at the beginning of each year for the next 35 years, up to how much may he withdraw? If he withdraws \$60,000 per year at the beginning of each year, how long will his retirement fund last?

Ans. If Mr. McGinty withdraws a fixed amount each year for 35 years, he may withdraw about \$49,000 per year:

| <u>Time Value of Money</u> | |
|----------------------------|--------------|
| BGN | BGN |
| P/Y | 1 |
| PV | \$950,000 |
| FV | \$0 |
| I/Y | 4% |
| N | 35 |
| <hr/> | |
| PMT= | -\$48,940.82 |

Or, if withdraws \$60,000 a year per year, his retirement fund will last 24 years:

| <u>Time Value of Money</u> | |
|----------------------------|-----------|
| BGN | BGN |
| P/Y | 1 |
| PV | \$950,000 |
| PMT | -\$60,000 |
| FV | \$0 |
| I/Y | 4% |
| <hr/> | |
| N= | 24 |

4. Matt and Lindsay met when taking the same personal finance course in college and got married shortly after graduation. Because they both appreciate sound financial planning, they've decided to start saving for retirement immediately. Both are currently 20 years old and plan to retire in 45 years at 65. They hope to live off of at least \$60,000 per year in retirement and want to save enough to last 40 years. They estimate they can earn an average return of 8% on their investments while saving for retirement, but after that will shift into less risky assets which they expect should yield around 3% per year. How much must Matt and Lindsay set aside at the end of each year to meet their goals?

Ans. First, Matt and Lindsay must plan to save up almost \$1.4 million:

| <u>Time Value of Money</u> | |
|----------------------------|--------------|
| P/Y | 1 |
| PMT | \$60,000 |
| FV | \$0 |
| I/Y | 3% |
| N | 40 |
| <hr/> | |
| PV= | -\$1,386,886 |

To do so, they should contribute about \$3,600 each year:

| <u>Time Value of Money</u> | |
|----------------------------|-------------|
| P/Y | 1 |
| PV | \$0 |
| FV | \$1,386,886 |
| I/Y | 8% |
| N | 45 |
| <hr/> | |
| PMT= | -\$3,588.27 |

5. Dan is 25 years old and committed to early retirement. He makes \$80,000 per year after taxes, of which he saves 25% for retirement. He expects to earn 5% on his investments. If, after he retires, Dan is willing to withdraw from principal such that he fully amortizes at age 95, show that Dan can retire in 26.5 years and sustain withdrawals of \$60,000 per year.

Ans. If Dan saves \$20,000 (25% of his \$80,000 salary) each year and earns a 5% return on his investments, he will accumulate \$1,057,392.12 in 26.5 years:

| <u>Time Value of Money</u> | |
|----------------------------|----------------|
| P/Y | 1 |
| PV | \$0 |
| PMT | -\$20,000 |
| I/Y | 5% |
| N | 26.5 |
| FV = | \$1,057,392.12 |

If he then retires and withdraws \$60,000 per year, his funds will last him another 43.66 years, or until he is $25 + 26.5 + 43.66 = 95.16$ years old:

| <u>Time Value of Money</u> | |
|----------------------------|--------------|
| P/Y | 1 |
| PV | -\$1,057,392 |
| PMT | \$60,000 |
| FV | 0% |
| I/Y | 5% |
| N = | 43.66 |

This problem confirms the result that we saw in the lecture slides. With a 25% savings rate and a 5% return, a saver expected to live another 70 years can retire in 26.5 years and live off their savings for the remainder of his lifetime.