

# **RETIREMENT SAVINGS AND INCOME PLANNING**

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## **RETIREMENT SAVINGS AND INCOME PLANNING**

### **Retirement Needs Analysis (Topic 52)**

#### **CFP Board Student-Centered Learning Objectives**

- (a) Identify and evaluate the assumptions used in analyzing retirement needs including: age at retirement, cash inflows and outflows in various stages of retirement, goal priority and importance, longevity, rate of investment return, market volatility, and effects of inflation.
- (b) Recognize the potential sources of income during retirement including social security, employer plan benefits, personal savings and investments, individual retirement plans and employment income.
- (c) Calculate an appropriate savings plan to meet funding needs and communicate the importance of having a well-funded retirement plan.
- (d) Recommend a plan for maximizing the probability of achieving the client's goals and mitigating longevity risk.
- (e) Use statistical and probability techniques in calculating retirement funding and income distribution plans.
- (f) Explain various patterns of work-to-retirement transitions and phased retirement.

#### ***Retirement Needs Analysis***

- A. *Assumptions for retirement planning*
  - 1) *Inflation*
  - 2) *Retirement period and life expectancy*
  - 3) *Lifestyle*
  - 4) *Total return*
- B. *Income sources*
- C. *Financial needs*
  - 1) *Living costs*
  - 2) *Charitable and beneficiary gifting objectives*
  - 3) *Medical costs, including long-term care needs analysis*
  - 4) *Other (trust and foundation funding, education funding, etc.)*
- D. *Straight-line returns vs. probability analysis*
- E. *Pure annuity vs. capital preservation*
- F. *Alternatives to compensate for projected cash flow shortfalls*
- G. *Phased retirement*

#### **Retirement Needs**

As the population ages, the emphasis in financial planning is

## Retirement Savings and Income Planning – Topic 52

### **Analysis**

shifting from planning for premature death to planning for a much longer retirement. Life expectancy has increased dramatically in the last century, making plans to retire for ten or fifteen years obsolete. Due to advances in medical science, the current length of retirement is closer to 25 years.

In addition to increasing longevity, current retirees are less likely to have defined benefit pension plans that promise a lifetime income from their employers and are more likely to be retiring with defined contribution plans, such as 401(k) plans, that will require the retiree to manage an investment portfolio and select a distribution rate throughout their retirement years. The decrease in employer-sponsored medical insurance coverage for retirees in recent years has also made planning for medical care expenses as well as long-term care expenses an essential part of retirement planning.

### **Three Phases of Retirement Planning**

In retirement planning there are three phases: accumulation, consolidation, and distribution. The accumulation of capital occurs during one's working years, roughly between ages 30 and 55. In the second phase, the phase of consolidation, the client restructures the investment portfolio to a more conservative allocation that will be subject to less fluctuation in asset value. The third phase is the distribution period when the retiree is collecting from private investments, Social Security, any employer-sponsored qualified or non-qualified plans, and individually directed qualified plans, such as IRAs and Roth IRAs. At each phase there is an interaction between inflation and current interest rates, and this interaction can affect the outcome of how much one can accumulate and what the capital sum will yield at retirement.

Yearly saving during one's working years is absolutely essential to accomplish the goal of building an adequate fund for retirement. Some conservatives set an objective of 10% of gross income devoted to savings. That is a goal which few can attain. What is important is setting a percentage which is attainable and putting those dollars regularly into a savings or investment vehicle which is appropriate for one's risk tolerance.

### **Assumptions for Retirement Planning Calculations**

The financial planner will use several assumptions in the calculations. It is important that these assumptions be reasonable and acceptable to the client. The large number of assumptions and length of time from beginning the accumulation phase through the distributions phase will assure that some of the assumptions will be incorrect; therefore, the retirement plan must be reviewed on a regular basis and adjustments made as appropriate.

**Inflation Rate**

The client needs to make an assumption regarding an amount of inflation during the accumulation period, as well as during the distribution phase in retirement. The effects of inflation over a long period of time, such as occurs in retirement planning, should not be overlooked or underestimated. The impact of inflation is significant and must be factored into the retirement plan.

**Retirement Period and Life Expectancy**

Clients need to determine how long they plan to be in retirement. In other words, clients need to make an educated guess on when they will retire and how long they will live. Clients can look to mortality tables (single or joint life tables) and then adjust this time up or down based on their health status and how long their relatives live. Conservative assumptions should be made. When looking at life expectancy tables, keep in mind that if the table tells you the life expectancy for a male who is currently age 65 is 19 years, that means that half of those who are currently age 65 are expected to die by age 84; but the other half are still living. If the client is in good health and has a family history of longevity, odds are good that he will be in the 50% still living, so the plan should allow for income to continue beyond that age.

**Lifestyle (Distribution Rate)**

Clients need to determine how much they will need for living expenses in retirement. A client's lifestyle will be the biggest factor in determining this amount, especially if the client enjoys a high-society lifestyle or enjoys traveling the world. Clients should look carefully at retirement goals and prioritize them. They should identify which goals they are not willing to compromise on, and which goals they may be willing to reduce or replace when a shortfall is projected, when inflation is higher than expected, when medical costs are higher than anticipated, or when investments do not perform as well as expected.

**Total Return**

The retirement account balance will provide the annual income during each year of retirement. The total return rate will assume how the corpus of the account will grow during that time period.

**Income Sources**

As part of the retirement income analysis method, clients should project all reliable sources of income. This projection should include consideration of options under employer-sponsored pension or deferred-compensation plans and Social Security. If there are lump-sum settlements available from profit-sharing or money-purchase pension plans, clients should consider investing these sums in growth investments to hedge against inflation. Striking a balance between conservative and aggressive investments is a challenge, particularly for retirees who have no

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### **Projection of Retirement Income (Financial Needs)**

current salary.

There are two ways to set up a projection of desired retirement income:

- (1) Income replacement ratio
- (2) Retirement income analysis

The income replacement ratio method requires a client to estimate a ballpark percentage of preretirement income which appears to be adequate to provide a standard of living at retirement, comparable to that being enjoyed before retirement. This method is appropriate when retirement is a decade or more in the future.

The percentage of replacement income required has been found to decline as the client's current income increases:

<b><u>Client Current Earnings</u></b>	<b><u>Replacement Ratio</u></b>
\$15,000 to \$60,000	72% to 82%
\$60,000 to \$90,000	72% to 78%
\$90,000 to \$120,000	60% to 75%

These rough estimates should be refined as the client gets closer to retirement age and develops a consistent lifestyle and more predictable budget.

The retirement income analysis method requires more systematic gathering of client information and should be used when the client approaches retirement. The client should be encouraged to put together a formal budget of expenses. A good place to start is to formulate a current cash flow or budget statement and then project any changes anticipated for retirement.

A financial planner should help the client estimate the amount of income that will be needed during retirement to maintain the desired lifestyle. A client will need to recognize that during retirement, some categories of expenses will increase, some will decrease, some will stay the same, and a new category or two may be added. Continuing expenses will include food, clothing, and shelter, but the bottom line may change if the client decides to move into a retirement/assisted-living facility. Those expenses which may disappear are tuition payments, mortgage payments, and car payments. Those expenses which may increase include prescription drugs and medical and dental care. New categories which might enter the picture are travel and entertainment, gifts for grandchildren, and charitable giving.

One of the largest potential expenses a retiree may face is the need for long-term care. If these prospective expenses are not insured against within the plan, prolonged nursing home care can quickly consume all of the retirement assets. The long-term care discussion is an essential part of every retirement plan and should be documented, even if it is simply to note that the client has chosen not to address possible long-term care needs. The client's acknowledgement of this choice within the written plan provides some protection for a planner who may be accused of malpractice by that client's children later on when long-term care expenses have consumed all of the parents' resources.

The planner must assimilate all of these factors in determining the relationship between current expenditures and those anticipated at retirement. This process allows an initial projection of retirement income. For planning purposes, this income figure needs to be inflated to future dollars at retirement.

**Calculation of the First Year in Retirement Income Need**

For example, if the planner determines that the retirement income need in 28 years is \$52,000 in today's dollars, that number must be inflated to equal the future dollars at the selected retirement age.

If the planner determines that the Spencer family would need \$52,000 of retirement income in today's dollars, subtracting \$14,000 of Social Security income (in today's dollars) leaves a net amount of \$38,000. Using a financial calculator, the planner then must inflate this income figure (pv), using the assumed inflation rate (i), and the number of periods to retirement (n), to arrive at its value at retirement (fv):

$$\begin{aligned}N &= 28 \\I &= 3\% \\PV &= \$38,000 \\PMT &= 0 \\FV &=?\end{aligned}$$

Solve for FV which is \$86,941.

**Calculation of Additional Funds Needed to Meet Objectives**

Once the first year in retirement income amount is determined, the planner will be able to begin to estimate the fund necessary at retirement to sustain the desired level of income through the retirement period.

**Calculation of the Retirement Fund**

To determine the retirement fund necessary at retirement (pv), the variables must be entered as follows:



- i – An inflation-adjusted interest rate must be used. This rate may be determined using a financial calculator or by using the following formula:

$$\left[ \left( \frac{1 + \text{Assumed interest rate}}{1 + \text{Assumed inflation rate}} \right) - 1 \right] \times 100$$

Using an assumed after-tax return of 9% and an assumed inflation rate of 3%, the inflation-adjusted rate of return would equal 5.8252%. The above formula is applied as follows:

$$[(1.09/1.03) - 1] \times 100 = 5.8252$$

An inflation-adjusted rate of return will result in a serial payment, that is, a payment that increases each year by the assumed rate of inflation. This is critical for retirement income projections.

Most financial calculators allow you to calculate an inflation-adjusted rate of return in a few keystrokes:

- N – The number of payments during the retirement period may be determined by using mortality tables. However, mortality table figures are based on averages. It may be more accurate to adjust the anticipated period based on other factors, such as family history and medical issues. It may be prudent to assume a longer life expectancy than the tables suggest.

PMT – This is the first year's income need, which was determined earlier. Because an inflation-adjusted rate of return is used, this payment will increase each year during retirement by the inflation factor.

PV – Solve for present value. This amount will be needed at retirement (point R on the timeline below) and will grow at the assumed rate of return, providing an inflation-adjusted income each year, which expires after the designated number of years at point E.

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***Example:***

Frank and Donna Spencer would like to retire when Frank reaches age 65, with a retirement income of \$52,000 (today's dollars). Frank is now 37 and Donna is 35. During retirement, they will need this income to keep pace with inflation, and they have

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determined that they need to plan for retirement income to last until Donna reaches age 95. They assume that their retirement assets will earn 7% after taxes during their retirement years, and that inflation will average 3%. What will the Spencers need to accumulate for retirement under these assumptions (based on today's dollars)?

To calculate the amount of retirement resources necessary at retirement for the Spencers:

1. The first year's inflation-adjusted figure for retirement income after Social Security benefits has already been calculated to equal \$86,941.
2. The number of years of retirement between R (retirement) and E (end of life expectancy) will be 32 years.

$$N = 32$$

3. The Spencers are assuming that their assets will grow during retirement at an after-tax rate of 7%, and that inflation will average 3%. Their inflation-adjusted rate of return will be:

$$[(1.07/1.03) - 1] \times 100 = 3.8835$$

$$I = 3.8835\%$$

4. During retirement, it is assumed that payments will be made at the beginning of the year, so the calculator must be set at BEG mode or "begin." Using the above assumptions, solve for present value (pv).

The answer calculates to \$1,638,515.

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If the Spencers have this level of assets, they will meet their retirement goals. Their first year's withdrawal from their assets will be \$86,941. At the beginning of their second year of retirement, their retirement assets will have grown 7%, and their withdrawal from those assets will be increased by 3%, to \$89,549. It is also assumed that the Social Security payment will be increased by inflation to provide a totally inflation-adjusted income. At the end of 32 years, the assets will be depleted, based on these assumptions. This assumes capital utilization or using up all of the assets. A capital preservation model would use the income from the investments but leave the principal intact.

**Calculation of  
Additional Funds  
Needed to Meet  
Objectives**

Up to this point, we have concentrated on the distribution period, the period during which income will be taken. The planner must now review current assets to determine whether they are sufficient to create the necessary amount needed at retirement.

N-----R-----E  
(Accumulation Phase) (Distribution Phase)

At this point, the planner analyzes current assets and projects their growth from now (N) to retirement (R). This amount is then compared to the need projected earlier to determine if sufficient assets exist or if additional savings are necessary.

Assume that the Spencers have accumulated assets which can be earmarked for retirement purposes, which equal \$90,000. The Spencers expect to average 9% on their preretirement savings.

The planner can now estimate the future value of these assets as follows:

N = 28 years  
I = 9%  
PV = \$90,000  
PMT = 0  
FV = ?

Solve for FV which is \$1,005,043.

During the accumulation phase, the planner will set the calculator to the “END” mode, using an assumption that savings payments will be made at the end of the year.

The future value of the current investments calculates to \$1,005,043. The previously estimated amount needed at retirement was \$1,638,515. The shortfall is:

Amount needed at retirement	\$1,638,515
Minus value of current assets	(1,005,043)
Shortfall needed at age 65	\$ 633,472

There are two methods that the Spencers can use to accumulate the necessary additional assets: level payments or serial payments.

**Level Payments  
Calculation**

The level payments method assumes that the Spencers will save a level amount each year during the accumulation period in order to reach the goal of \$633,472. It has already accounted for inflation

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since the \$633,472 is the dollar amount needed by age 65 based on the inflation adjustments made in the first two calculations. The calculation is as follows:

$$\begin{aligned}N &= 28 \\I &= 9\% \\PV &= 0 \\PMT &= ? \\FV &= \$633,472\end{aligned}$$

Solve for payment which is \$5,607.52

The Spencers will need to save \$5,607.52 each year for the 28 years of the accumulation period, assuming a 9% average rate of return, in order to accumulate the \$633,472 of additional assets needed, along with their current assets, to be able to provide the inflation-adjusted income during the distribution period.

### **Serial Payments Calculation**

Serial payments increase each year by the inflation assumption. As such, they provide an inflation adjustment to the accumulation period because the payments increase each year to keep pace. In order to calculate the first year's serial payment, the planner must recognize that inflation must be removed from the age 65 value since it will be accounted for in the serial payments and cannot be accounted for twice. In order to accomplish this calculation, the planner will deflate the age 65 value of \$633,472 by the following method:

$$\begin{aligned}N &= 28 \\I &= 3\% \\PV &= ? \\PMT &= 0 \\FV &= \$633,472\end{aligned}$$

Solve for present value which is \$276,876

A serial payment is determined by using an inflation-adjusted interest payment in the same manner it was used to determine the annually increasing income payment during the distribution phase.

The assumed rate of return during the accumulation phase is 9%, and the inflation rate assumption is 3%. The calculation for the inflation-adjusted rate of return is performed as follows:

$$[(1.09/1.03) - 1] \times 100 = 5.8252$$

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To calculate the first year's serial payment, the planner now inputs the following:

$$\begin{aligned}N &= 28 \\I &= 5.8252\% \\PV &= 0 \\PMT &= ? \\FV &= \$276,876\end{aligned}$$

Assuming payments are made at the end of the year, the payment (PMT) calculates to \$4,155.92. This amount must now be increased by the inflation rate (3%) to provide the first year's serial payment:

$$\begin{array}{r} \$4,155.92 \\ \underline{124.68} \\ \$4,280.60 \end{array}$$

The Spencers may begin increasing annual savings at \$4,280.60 but must increase the savings amount each year by 3% in order to accumulate \$633,472 by retirement.

Either method – level payment or serial payments – will bring the Spencers to the same savings amount at retirement.

### **Straight-Line Returns vs. Probability Analysis**

A financial planner should always remember the sensitivity of variables when evaluating a client's retirement needs analysis. One of the most sensitive variables is the rate of return assumed during the client's life. For example, if a client assumed an 8% rate of return over a 40-year period, the client will actually experience years with returns lower than 8% and years with returns higher than 8%. As a result of these uncertain returns, financial planners should run probability analyses (Monte Carlo simulations) using planning software, in addition to using straight-line returns.

### **Pure Annuity vs. Capital Preservation**

If the client is concerned about outliving his or her assets, the client might want to consider purchasing an annuity or using the capital preservation method.

An annuity will provide an annual income stream during the client's life. As a result, once the client purchases the annuity, he or she is assured the annual income stream from the annuity company. When using the retirement income analysis method to determine income needs in retirement, the planner may divide retirement expenses into two categories: essential and discretionary. Essential expenses are those that must be paid in the

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amounts indicated; for example, debt payments, property taxes, and insurance premiums. Discretionary expenses may include vacations and charitable gifts, among others.

One strategy to ensure essential expenses can be covered no matter how long the client lives is to match total essential expenses with guaranteed lifetime income streams, such as pension and Social Security. Any essential expenses not covered by these life incomes can be insured through annuitizing a portion of the client's retirement portfolio. Annuity payments will protect against longevity risk for all of the essential expenses, while discretionary expenses are paid from income generated by the remaining investment portfolio. If the portfolio does not do well in a particular year, discretionary expenses can be reduced or delayed until another year when the portfolio has performed more favorably.

**The capital preservation method assumes the client will live on the earnings generated by his or her investment portfolio.** As a result, the principal balance is left untouched, which can provide the client with a nest egg, in the event it is needed later in life. This method differs from the **capital utilization method, which assumes all assets are gradually liquidated during retirement to meet the client's objectives.** Due to the different assumptions, the capital preservation method requires a larger capital sum.

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### *Example:*

Scott and Kay Andersen would like to retire today with a retirement income of \$60,000 per year for 30 years. They assume that their retirement assets will earn 6% after taxes during their retirement years, and that inflation will average 3%. What amount of capital do the Andersens need to fund this goal today, assuming the capital utilization method and the capital preservation method?

To calculate the amount needed under the capital utilization method, input the following variables into your financial calculator:

N = 30  
I = 6  
PV = ?  
PMT = 60,000  
FV = 0

Solve for PV, using BEG mode, which is \$875,443.

To calculate the amount needed under the capital preservation method, we need to solve for what amount of assets will generate \$60,000 of annual earnings at 6%. The formula is:

$$\$60,000 = PV \times 6\%$$

$$\text{Thus, } PV = \$60,000 / 6\% = \$1,000,000$$

As a result of using the capital preservation method, the Andersens need to have \$124,557 (\$1,000,000 – \$875,443) more at retirement.

**Editor's Note:** The inflation rate given in the facts is not used in the calculations since the Andersens want a flat \$60,000 per year in retirement. If the facts were that they wanted \$60,000 per year in today's dollars, then you would have used the inflation adjusted rate of return.

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## Longevity Insurance

As an alternative to buying a life annuity at retirement, some planners are adding longevity insurance to the client's retirement portfolio. Longevity insurance is a single premium deferred annuity that is structured to begin payout at a specified age, typically around age 85 (life expectancy). The payments will then continue for the rest of the client's life. Purchasing the deferred annuity 20 or more years before the deferred payout (e.g., purchasing it at age 65 when retirement starts, with payout at age 85) allows for the premium dollars to purchase a larger payment stream than an immediate annuity purchased at the same age. This larger payment stream is available because the insurance company has the lump-sum investment available for its use for a long period of time, and because many of the insureds purchasing the life annuity will either die before payout begins at life expectancy (remember life expectancy means a 50% chance of being alive at that age and a 50% chance of dying before that age) or receive payments for only a few years. For those who will outlive that life expectancy, the annuity payments provide peace of mind that they will receive an income for the rest of their lives.

## Alternatives to Compensate for Projected Cash Flow Shortfalls

If the client is unable to accumulate the necessary funds to achieve his or her goals, the client will need to consider alternatives to address the projected cash flow shortages. The alternatives will vary from client to client, based on their individual situations and goals. However, some common alternatives include the following:

- The client could downsize his or her home.
- The client could postpone retirement.

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- The client could work on a part-time basis.
- The client could scale back some of his or her goals (e.g., travel less, pay for a smaller portion of their children's education, decrease charitable gifts, etc.).
- The client could cut back on expenses.
- The client could change his or her asset allocation to increase the overall return, consistent with their risk tolerance level.

### **Work-to-Retirement Transitions and Phased Retirement**

Patterns of work-to-retirement transitions are diverse. Most people tend to think of retirement as “one day I go to work, and then the next day I stop forever”. Frequently, however, the transition to retirement is not quite so cut-and-dry and often involves a change in jobs prior to complete withdrawal from the work force. Some choose to continue to work to maintain their standard of living or to maintain health insurance benefits. Some change jobs from necessity, others from a desire to pursue an occupation they may enjoy more. Studies have found that those who work in retirement tend to be highly satisfied and engaged in their work.

A phased retirement is a gradual reduction in hours or commitments at work as opposed to a sudden cessation of all work. Some planners and clients will decide on a phased retirement to overcome a potential income shortfall or to deal with health issues. Other retirees will seek a phased retirement to allow them the opportunity to change their lifestyle gradually rather than ending all work abruptly. These retirees may be concerned about becoming bored after retirement, or may fear losing touch with the social network they have at work, or they may want to continue working because it makes them feel productive.

The Pension Protection Act of 2006 has allowed companies greater flexibility in enabling employees to enter into a phased retirement by allowing for limited distributions from qualified pension plans at age 62 without separation from service.



## **Application Questions**

Use the following fact set to answer Questions 1-3.

Paul and Lucinda Reynolds (ages 57 and 56, respectively) have determined that they will require retirement income equal to \$63,000, based on current income. They plan to retire in 8 years and wish to assume an after-tax return on their investments, prior to retirement, of 8%. They plan to readjust their assets after retirement and believe that their net return will drop to 6%. Paul's parents are both in their late eighties, and Lucinda's parents are in their seventies. Paul and Lucinda assume that retirement will last for 30 years, and that inflation will average 2%.

1. What will be their first year's income at retirement?
  - A. \$63,000
  - B. \$73,815
  - C. \$79,807
  - D. \$99,954
  - E. \$116,609
  
2. What is the amount of capital necessary to support their income need? (Answer within \$25.)
  - A. \$897,467
  - B. \$1,077,007
  - C. \$1,089,492
  - D. \$1,288,655
  - E. \$1,339,182
  
3. If the Reynolds decided to count their projected Social Security benefits of \$14,251 in today's dollars per year, what would be the capital amount necessary?
  - A. \$1,036,247
  - B. \$1,265,801
  - C. \$1,444,781
  - D. \$1,476,712
  - E. \$1,539,971

## Retirement Savings and Income Planning – Answers and Explanations – Topic 52

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Use the following fact set to answer Questions 4-6.

Phil Pattison wants to retire in 15 years at age 65. He has determined that he will need a capital sum of \$2,354,000 at that time to provide his retirement income. He presently has a retirement plan with a balance of \$350,000, to which he will add \$26,000 per year. Phil assumes that his preretirement and postretirement rates of return will be 8%, and that inflation will average 3%. He will not consider Social Security benefits in his planning. He expects to live to at least age 80 but wants to use age 95 for all calculations.

4. How close will Phil come to his goal of a capital sum of \$2,354,000?
- A. He will be short by \$537,786.
  - B. He will be short by \$1,086,435.
  - C. He will achieve his goal, with a surplus of \$156,900.
  - D. He will achieve his goal, with a surplus of \$253,895.
  - E. There is not sufficient information to determine whether he will achieve his goal or not.
5. Which of the following is most important for the planner to determine prior to making a recommendation for Phil regarding his retirement planning needs?
- A. The inflation rate for medical services
  - B. Whether Phil expects to receive an inheritance
  - C. The assumptions used in calculating the capital sum need
  - D. His projected tax bracket in retirement
  - E. His risk tolerance
6. What can Phil expect his annual income to be if he reaches his capital sum goal of \$2,354,000?
- A. \$120,099
  - B. \$143,626
  - C. \$145,839
  - D. \$193,611
  - E. \$209,100

\*\*\*\*\*

Use the following fact set to answer Questions 7 and 8.

Frank Aldrich has been working at Regal Associates for many years and is planning to retire in 12 years. He needs to accumulate a capital sum of \$1,157,899 by retirement. Based on current projections, his current assets will equal \$980,000 at retirement. Frank realizes that he needs to save additional money for retirement and wishes to know how much. Assume that inflation will equal 3%, and after-tax investment return will be 7%.

7. On a level savings basis, how much should Frank save each year to achieve his goal?
- A. \$8,912
  - B. \$9,294
  - C. \$9,945
  - D. \$11,473
  - E. \$11,919
8. If Frank decides to use a serial payment, what would be his first year's savings amount?
- A. \$7,839
  - B. \$8,047
  - C. \$8,360
  - D. \$8,610
  - E. \$8,792

### Retirement Savings and Income Planning – Answers and Explanations – Topic 52

For practice answering case questions related to Topic 52, please answer the following questions in the cases included in the Appendix at the back of this textbook.

<b>Case</b>	<b>Questions</b>
Gordon	
Roland	1, 2, 3, 4, 5, 6, and 7
Loomis Company	
Kramer Transportation Services, Inc.	
Sparks	
Lytle	
Beals	
Edmonds	1
McGee	1
Michael and Diana Eastman	
Kenneth and Laurie Perkins	1
John and Brianna Harrison	1, 2, 3, 4, and 5

### **Answers and Explanations**

**1. B** is the answer. Current income need (\$63,000) should be adjusted by the inflation factor (2%) for the time period until retirement (8 years). To solve this problem on your financial calculator, you need to input:

$$\begin{aligned}N &= 8 \\I &= 2 \\PV &= 63,000 \\PMT &= 0 \\FV &= ?\end{aligned}$$

Solve for FV which is \$73,815.

**2. E** is the answer. The capital required is calculated using a first year's income of \$73,815, an inflation-adjusted rate of return of 3.9216% [ $i = (1.06/1.02 - 1) \times 100$ ], and 30 years of retirement. To solve this problem on your financial calculator, you need to set the calculator for the "begin" mode and then input:

$$\begin{aligned}N &= 30 \\I &= 3.9216 \\PV &= ? \\PMT &= 73,815 \\FV &= 0\end{aligned}$$

Solve for PV which is \$1,339,182.

**3. A** is the answer. Since Social Security payments are inflation indexed, the \$14,251 must be subtracted from the current value of \$63,000. The result is then inflated to retirement and used to determine the capital sum necessary on your calculator with:

$$\begin{aligned}N &= 8 \\I &= 2 \\PV &= 48,749 \\PMT &= 0 \\FV &= ?\end{aligned}$$

Solve for FV which is \$57,117.

The next step is to solve for the amount of capital based on this new payment amount. To solve this problem on your financial calculator, you need to set the calculator for the "begin" mode and then input:

$$\begin{aligned}N &= 30 \\I &= 3.9216 [i = (1.06/1.02 - 1) \times 100] \\PV &= ? \\PMT &= 57,117 \\FV &= 0\end{aligned}$$

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Solve for PV which is \$1,036,243.

**4. A** is the answer. The current plan assets with annual contributions will grow at 8% for 15 years, to a value of \$1,816,214 (“end” of year mode), which is \$537,786 (\$2,354,000 – \$1,816,214) short of his goal. To solve this problem on your financial calculator, you need to set the calculator for the “END” mode and then input:

N = 15  
I = 8  
PV = -350,000  
PMT = -26,000  
FV = ?

Solve for FV which is \$1,816,214.

**5. C** is the answer. This is an example of a Job Task Domain 2 (Gathering Information Necessary to Fulfill the Engagement) question. At this point the planner has been given a capital sum need determined by the client but does not have any information regarding where this number came from. Did the client use an online calculator? Was inflation factored in pre- and post-retirement? Did the client decide to use the same number that his brother-in-law told him he needed? Before the planner can move forward with any analysis and recommendation he needs to verify the assumptions used and determine that the goal is valid. Answer choices D and E should also be determined, but the question asks which one is MOST important.

**6. D** is the answer. To solve this problem set the financial calculator to “begin” mode and input:

N = 30  
I = 8  
PV = 2,354,000  
FV = 0  
PMT = ?

**Note 1:** The inflation is ignored as there is mention of keeping current with inflation or increasing income during retirement. The calculation must be based on the information provided. Had the question stated that he needs \$x in today’s dollars or that he would like his income to increase with inflation each year the calculation would require the use of the real return for I.

**Note 2:** Question 5 and question 6 should each be considered independently of the other, so in question 6 (a Job Task Domain 3 question requiring the planner to analyze the current situation to determine the monthly income the client can expect to receive), the numbers provided must be assumed to be accurate numbers. In answering questions with provided numbers, students should use the numbers provided.

**7. C** is the answer. His shortfall is \$177,899 (\$1,157,899 – \$980,000). To solve this problem on your financial calculator, you need to set the calculator for the “END” mode and then input:

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$$\begin{aligned}N &= 12 \\I &= 7 \\PV &= 0 \\PMT &= ? \\FV &= 177,899\end{aligned}$$

Solve for PMT which is \$9,945.

**8. D** is the answer. Inflation must first be removed from the difference by inputting:

$$\begin{aligned}N &= 12 \\I &= 3 \\PV &= ? \\PMT &= 0 \\FV &= 177,899\end{aligned}$$

Solve for PV which is 124,775.

This answer becomes future value (fv), and an inflation-adjusted rate of return (which puts inflation back into the equation) is used to determine the payment after setting the calculator to the end mode. The final step is to increase the answer by one year's inflation (3%), to arrive at the first serial payment. To solve this problem on your financial calculator, you need to set the calculator for the "END" mode and then input:

$$\begin{aligned}N &= 12 \\I &= 3.883 [I = (1.07/1.03 - 1) \times 100] \\PV &= 0 \\PMT &= ? \\FV &= 124,775\end{aligned}$$

Solve for PMT which is \$8,360.

In order to solve for the first payment, multiply \$8,360 by 1.03 (to add the 3% inflation), which is \$8,610.