Multiple Choice

1. Suppose Ken is saving for his retirement, depositing $7,000 in a savings account at the end of each of twenty years. If Ken earns 5% on his savings, the balance in his account as of the last deposit is closest to:
   a. $87,235
   b. $231,462
   c. $243,035

   \[ \text{PMT} = 7,000 \]
   \[ \text{N} = 20 \]
   \[ i = 5\% \]
   Solve for \( FV \rightarrow FV = 231,461.68 \]

2. Wilma has been depositing $10,000 per year into her Roth IRA. If she makes a total of 35 deposits and earns 6% on her savings, with her first withdrawal a year after her last deposit, the amount she can withdraw each year in retirement for thirty years is closest to:
   a. $10,533
   b. $76,374
   c. $80,956

   \[ \text{PMT} = 10,000 \]
   \[ \text{N} = 35 \]
   \[ i = 6\% \]
   Solve for \( FV \rightarrow FV = 1,114,347.80 \]

   \[ \text{PV} = 1,114,347.80 \]
   \[ \text{N} = 30 \]
   \[ i = 6\% \]
   Solve for \( PMT \rightarrow PMT = 80,956.15 \]

3. Suppose Barbie as $1 million saved by her 70th birthday. Barbie is planning on making thirty, even withdrawals starting on her 71st birthday. She can earn 4% per year on her savings. The amount that Barbie can withdraw each year in retirement and have nothing left at the end is closest to:
   a. $55,606
   b. $57,830
   c. $58,880

   \[ \text{PV} = 1,000,000 \]
4. Fred is planning on taking $50,000 per year out of his Roth IRA to help with his retirement needs, and he also wants to leave $100,000 for his children upon his death. Fred expects to live for twenty years into his retirement, until he is 88, making withdrawals starting on his 68th birthday, with the last withdrawal on his 87th birthday. If Fred can earn 3% on his savings, the balance he needs in his savings account on his 67th birthday to meet his needs is closest to:

a. $797,629
b. $799,241
c. $821,558

PMT = $50,000
N = 20
i = 3%
Solve for PV → PV = $743,873.74

FV = $100,000
N = 21
i = 3%
Solve for PV → PV = $53,754.93

Why not simply put the FV into the first calculation? Because the amount left on his death ($100,000 at age 88) is one year beyond the last withdrawal (at age 87).

Balance on his 67th birthday = $743,873.74 + $53,754.93 = $797,628.67

Short answer

5. Sue and Bob plan to save for retirement. Both are currently 30 years old and both intend to retire at age 65, taking their first withdrawal from their IRA at age 66. Sue plans to start saving now, putting $10,000 in a Roth IRA account today and then each year with her last deposit at age 65. Bob plans to start saving later, with his first deposit of $25,000 on his 45th birthday, and each year thereafter with his last deposit at age 65.

Both Sue and Bob have life expectancies of 86 years, so their last annual retirement withdrawal will be on their 85th birthday. Both Sue and Bob can earn 5% in their IRAs.

a. How much will Sue have in her IRA on her 65th birthday?

PMT = $10,000
N = 36
i = 5%
Solve for FV → FV = $958,363.23
b. How much will Bob have in his IRA on his 65th birthday?

\[
PMT = \$25,000 \\
N = 21 \\
i = 5\% \\
\text{Solve for FV} \rightarrow FV = \$892,981.30
\]

c. How much can Sue withdraw each year in retirement if her withdrawals are each the same amount?

\[
PV = \$958,363.23 \\
N = 20 \\
i = 5\% \\
\text{Solve for PMT} \rightarrow \$76,901.55
\]

d. How much can Bob withdraw each year in retirement if his withdrawals are each the same amount?

\[
PV = \$892,981.30 \\
N = 20 \\
i = 5\% \\
\text{Solve for PMT} \rightarrow \$71,655.13
\]

6. Harry intends on retiring in thirty years, requiring $50,000 per year in addition to Social Security. He plans to deposit the same amount each year into a Roth IRA, starting next year, with the last deposit when he is 65. He expects to start withdrawing on his 66th birthday. Harry believes that he can earn
5% per year on his retirement savings and that he will require thirty withdrawals, leaving nothing to his heirs.

a. What is the balance in his retirement account on his 65th birthday?

\[
PMT = \$50,000 \\
N = 30 \\
i = 5\% \\
\text{Solve for } PV \rightarrow PV = \$768,622.55
\]

b. What must his annual savings be to meet his retirement needs?

\[
FV = 768,622.55 \\
N = 30 \\
i = 4\% \\
\text{Solve for } PMT \rightarrow PMT = \$11,568.87
\]

c. If Harry intends on buying a yacht for $500,000 on his 66th birthday, using his retirement savings, how much must he save each year?

\[
PMT = \$50,000 \\
N = 30 \\
i = 5\% \\
\text{Solve for } PV \rightarrow PV = \$768,622.55
\]

Add present value of the yacht: $500,000 ÷ 1.05 = $476,190.48

Needed on his 65th birthday = $768,622.55 + 476,190.48 = $1,244,813.03

FV = $1,244,813.03
N = 30
i = 54%
Solve for PMT → PMT = $18,736.22