

# NJFR CALCULATOR WORKBOOK

*This workbook provides an assortment of problems that can be solved using the NJFR calculator (and solutions)*

*Some problems will require one set of keys, some will require multiple calculations using the same set of keys, and other problems could require two or more different colored sets of keys.*

*To avoid making it obvious which keys are to be used, each problem is presented with one set of the keys that are available to be used. (NOTE: some problems can be solved in several different ways. The key is to get the same answer, even if using a different solution)*

*When solving problems, it can be very helpful to identify the numbers that are relevant to the calculation, and what they represent (such as current income, annual amount, rate of return, etc. This can help identify which set(s) of keys are needed. Remember, each color set of keys represents a particular type of calculation:*

- You know the current amount and want to know the future value or cost. >> **YELLOW** (yellow key calculations do NOT need **ROR**)
- You know the future amount and want to know what it would be worth (or equivalent to) a specified number of years before you will receive it. >> **RED AND ROR**
- You want to know how much you would need to invest to replace 2 or more years of future income >> **GREEN AND ROR**
- You want to know how much investing money each year for 2 or more years would be worth in the future >> **GREEN AND ROR**
- You know how much you have to invest and want to know how much you can withdraw, or how long your money would last, if you withdrew a specific amount. >> **BLUE AND ROR**

## Summary of problems that follow:

**Problem 1:** Kim is 40. She wants to have \$1 million by the time she is 65. She can afford to invest \$10,000 a year currently, would plan to increase her investments by 5% each year, and expects her investments to earn 8% each year. Will she reach her million dollar goal?

**Problem 2:** Herb is 55 and has \$3 million dollars. A comfortable lifestyle for he and his wife would cost \$150,000 in current dollars. He wants to retire now and they expect to live 35 years. Assuming inflation is 3%, and his investments earn 8%, would he be able to maintain his current level of spending for the 35 years of retirement?

**Problem 3:** Mike is changing jobs and has \$100,000 in a 401K plan to roll over. The investment he is planning to use can be purchased either by paying \$3000 up front and .25% of the value of his account / year, or by paying nothing up front, and paying 1% of the value of the account each year. If he plans to leave the money invested for 20 years, assuming an average rate of return of 7%, what would each be worth and which is his better choice?

**Problem 4:** Audrey sold her home 5 years ago. The new owners are currently paying only interest, but have a balloon payment of \$500,000 due in 10 years. If Audrey wants to retire now, what would that balloon payment be worth in "retirement" dollars if she assumes the money would have earned 6% a year?

**Problem 5:** Bob and Debbie are divorcing. They have a handicapped son. It was recommended that they put a portion of their joint asset in a separate account to pay for 1 day a week of outside daycare based on a current cost of \$120 / week (6 hours at \$20/hr). Assuming that the money invested earns 6% / year, and that the cost of the care increases 5% / year, how much of their joint assets would go into this account if they assumed the funds would be needed for 40 years?

**Problem 6:** Rich and Barb have enough cash to pay for a house, but would rather keep that for other spending. The 30 year mortgage would cost \$700 / month with \$3000 closing costs. The 15 year mortgage would cost \$1100 / month with \$1000 closing costs. They are trying to decide whether the 15 year or 30 year mortgage, including closing costs, would require the lowest "replacement" amount assuming a 6% rate of return is assumed.

**Problem 7:** Larry is ready to buy a boat. He really wants the one that will cost \$200,000, but realizes that if he buys the one that costs \$150,000, he could invest the \$50,000 he saved at 6% and have extra money each

year to spend during hunting season. If he assumes he would keep the boat for 15 years, how much more would he have available to spend during hunting season during those 15 years if he assumes the cost of hunting goes up 5% / year over that 15 years?

**Problem 8:** Brent is 45. He was expecting a pension of \$2000 / month starting at age 65, but now that his pension has been frozen, he will only receive \$1200 / month. How much would he need to save in the next 20 years to have enough money to fill the \$800 / month “gap” for 30 years of retirement if he assumes his investments would earn 7%?

**Problem 9:** Phil wants to have \$1 million in 15 years. If his investments earn 6% / year and he increases his investments by 10% / year, how much does he need to invest this year to for his investments to be worth \$1 million in 15 years. (because the answer (unknown value) is one that is normally entered as data, this problem requires an indirect calculation which involves entering different values for the unknown annual amount until the future amount that has been specified is produced)

**Problem 10:** Pam can save \$3000 a year now. It would be fairly easy for her to increase her savings by 3% / year, but she would have to give up some things that are important to increase her savings by 10% / year. She expects retirement to last 20 years and wants to be able to increase her withdrawals 3% / year throughout retirement if she assumes a 5% rate of return through retirement. She wants to know how much more she would be able to spend in retirement if she increased her investments each year for the next 25 years by 10% instead of 3%, assuming her investments earned an average rate of return of 7% / year.

**Problem 11:** Assuming her investments earned 7% and she invested \$2000 each year for 20 years, Michelle wants to know how much this would allow her to spend each in retirement (lasting 30 years) each year, again assuming no increase in the annual amount during retirement, and how much that would be worth in current dollars assuming an inflation rate of 3% during the 20 years.

**Problem 12:** Kerry figures she can save \$2000 / year if she buys a used car instead of a new car. If she did that over 20 years, and invested the savings each year at 8%, how much would she have accumulated?

**Problem 13:** Jim does not NEED his social security for current expenses. He needs to decide whether to take social security at 62 or 65. If he takes it at 62, he will get \$800 / month. If he takes it at 65, he will get \$1000 / month. He believes his social security benefits will increase 2% / year. If he expects to live to 80, he wants to know which is the best choice if he assumes a rate of return of 7% for comparison.

**Problem 14:** Charlotte has \$2 million dollars for retirement and expects to live 20 years. She has 3 children and wants to know how much she can afford to spend a year if she also wants to leave each of her children \$250,000. She assumes an increase in withdrawals of 4% / year, and a rate of return on investments of 5% / year.

**Problem 15:** Charlie and Dottie want to save enough money to provide for their new child’s college costs (4 years). The money will be needed in 18 years. Current costs are \$8000 and are estimated to increase 7% / year. If they invest \$3000 / year, assuming the money earns 7%, will they have enough by the time their child is 18?

**Problem 16:** Joe’s parents invested money for him throughout his childhood. He is now 25 years old, and those investments are worth \$400,000. He’s been reading about risk / return relationships and wants to know what his investment would be worth by age 60 if it earned 2% / year, 5% / year, or 8% / year.

**Problem 17:** Jeremy is 25 and just got his first social security report. It shows that at 67 his monthly social security benefit will be \$1800 / month. He wants to know what that would be worth in today’s dollars

**Problem 18:** Bob investment plan consists of \$5000 a year for 10 years, then \$10,000 a year for 10 years, then \$20,000 for 10 years. He wants to know how much he should have in 30 years if he assumes his investments will earn 6% / year.

**Problem 19:** Ron and Sue expect to live 35 years in retirement. Recognizing that their health may not always be as good as it is now, they want to plan for 20 years of very active retirement with lots of travel and golf and such, then cut back for the following 15 years. They want to know how much money they would need to invest, assuming a 6% rate of return, to generate \$60,000 / year with a 5% cost of living increase for the first 20 years, then \$35,000 a year (in current dollars) for the following 15 years.

**Problem 20:** Carlos wants to invest enough money today to leave \$10 million for his future grandchildren 100 years from now. If he assumes the money he invests will earn 5% / year, how much would he need to invest?

**Problem 1:**

Kim is 40. She wants to have \$1 million by the time she is 65. She can afford to invest \$10,000 a year currently, would plan to increase her investments by 5% each year, and expects her investments to earn 8% each year. Will she reach her million dollar goal?

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

ANSWER \_\_\_\_\_

**Solution – problem 1:**

number entered	key to press
10000	Green Annual amount
5	Green % Increase / yr
25	Green Years
8	Tri-color ROR
	Green Replacement \$
press	Green Future amount

**ANSWER : 1154040.0. Yes, she will exceed her goal**

**Problem 2:**

Herb is 55 and has \$3 million dollars. A comfortable lifestyle for himself and his wife would cost \$150,000 in current dollars. He wants to retire now and they expect to live 35 years. Assuming inflation is 3%, and his investments earn 8%, would he be able to maintain his current level of spending for the 35 years of retirement?

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

ANSWER \_\_\_\_\_

**Solution – problem 2:**

Using Blue Keys

number entered	key to press
3000000	Blue retirement funds
3	Blue % Increase / yr
35	Blue Years
8	Tri-color ROR
press	Blue Yr 1 spending

Using green keys

number entered	key to press
150000	Green Annual amount
3	Green % Increase / yr
35	Green Years
8	Tri-color ROR
press	Green Replacement \$
	Green Future amount

**ANSWER : 171534.32**

**ANSWER : 262331.60.**

**Which means he has more than enough to finance this retirement**

**Problem 3:**

Mike is changing jobs and has \$100,000 in a 401K plan to roll over. The investment he is planning to use can be purchased either by paying a commission of \$3000 up front (leaving \$97,000 to be invested) and 0.25% of the value of his account / year, or by paying nothing up front, and paying 1% of the value of the account each year. If he plans to leave the money invested for 20 years, assuming an average rate of return of 7%, what would each be worth and which is his better choice? (HINT:  $7\% - .25\% = 6.75\%$  net return, and  $7\% - 1\% = 6\%$  net return)

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

ANSWER \_\_\_\_\_

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

ANSWER \_\_\_\_\_

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

**Solution – problem 3**

- Option A: Need to subtract \$3000 up front fees from \$100,000 total amount = \$97,000 to invest. 7% return - .25% annual expenses = 6.75% / year net return
- Option B: \$100,000 invested. 7% rate of return – 1% annual expenses = 6% net rate of return

Option A

number entered	key to press
97000	Yellow current amount
6.75	Yellow % increase / yr
20	Yellow years
press	Yellow future amount

Option B

number entered	key to press
100000	Yellow current amount
6	Yellow % increase / yr
20	Yellow years
press	Yellow future amount

**ANSWER : 358203.15**

**ANSWER : 320713.54**

**He would have almost \$38,000 more choosing option A.**

**Problem 4:**

Audrey sold her home 5 years ago. The new owners are currently paying only interest, but have a balloon payment of \$500,000 due in 10 years. If Audrey wants to retire now, what would that balloon payment be worth in “retirement” dollars if she assumes the money would have earned 6% a year?

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

ANSWER \_\_\_\_\_

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

ANSWER \_\_\_\_\_

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

**Solution – problem 4**

number entered	key to press
500000	Red future amount
10	Red yrs to received
6	Tri-color ROR
press	Red current value

**ANSWER : 279197.38**

**Problem 5:**

Bob and Debbie are divorcing. They have a handicapped son. It was recommended that they put a portion of their joint asset in a separate account to pay for 1 day a week of outside daycare based on a current cost of \$120 / day (6 hours at \$20/hr). Assuming that the money invested earns 6% / year, and that the cost of the care increases 5% / year, how much of their joint assets would go into this account if they assumed the funds would be needed for 40 years?

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

ANSWER \_\_\_\_\_

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

ANSWER \_\_\_\_\_

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

**Solution – problem 5**

- To get annual cost of care, multiply 120 / week x 52 weeks = \$6,240 / year

number entered	key to press
6240	Green Annual amount
5	Green % Increase / yr
40	Green Years
6	Tri-color ROR
press	Green Replacement \$
	Green Future amount

**ANSWER : 208721.95**

**Problem 6:**

Rich and Barb have enough cash to pay for a house, but would rather keep that for other spending. The 30 year mortgage would cost \$700 / month with \$3000 closing costs. The 15 year mortgage would cost \$1100 / month with \$1000 closing costs. They are trying to decide whether the 15 year or 30 year mortgage, including closing costs, would require the lowest “replacement” amount assuming a 6% rate of return is assumed. (HINT: with a fixed mortgage, the increase / year = 0%)

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

ANSWER \_\_\_\_\_

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

ANSWER \_\_\_\_\_

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

**Solution – problem 6**

- \$700 / month = \$8400 / year, plus \$3000 closing costs
- \$1100 / month = \$13200 / year, plus \$1000 closing costs

\$700 / month 30 year mortgage

number entered	key to press
8400	Green Annual amount
0	Green % Increase / yr
30	Green Years
6	Tri-color ROR
press	Green Replacement \$
	Green Future amount

**ANSWER : 122562.05**  
**Plus \$3000 =**  
**TOTAL : 125562.05**

\$1100 / month 15 year mortgage

number entered	key to press
13200	Green Annual amount
0	Green % Increase / yr
15	Green Years
6	Tri-color ROR
press	Green Replacement \$
	Green Future amount

**ANSWER : 135893.78**  
**plus \$1000 =**  
**TOTAL : 136893.78**

**Problem 7:**

Larry is buying a boat. He wants the one that costs \$200,000, but realizes if he buys the one that costs \$150,000, he could invest the \$50,000 he saved at 6% and have extra money each year to spend during hunting season. If he assumes he would keep the boat for 15 years, how much more would he have available to spend during hunting season during those 15 years if he assumes the cost of hunting goes up 5% / year over that 15 years?

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

ANSWER \_\_\_\_\_

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

ANSWER \_\_\_\_\_

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

**Solution – problem 7**

number entered	key to press
50000	Blue retirement funds
5	Blue % Increase / yr
15	Blue Years
6	Tri-color ROR
press	Blue Yr 1 spending

**ANSWER : 3559.02 (year 1),increasing 5% / yr**

**Problem 8:**

Brent is 45. He was expecting a pension of \$2000 / month starting at age 65, but now that his pension has been frozen, he will only receive \$1200 / month. How much more savings would he need by 65 to have enough money to fill the \$800 / month “gap” for 30 years of retirement if he assumes his investments would earn 7%?

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

ANSWER \_\_\_\_\_

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

ANSWER \_\_\_\_\_

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

**Solution – problem 8**

- $\$800 / \text{month} \times 12 \text{ months} = \$9600 / \text{year}$

number entered	key to press
9600	Green Annual amount
0	Green % Increase / yr
30	Green Years
7	Tri-color ROR
press	Green Replacement \$
	Green Future amount

**ANSWER : 127465.67**

**Problem 9:**

Phil wants to have \$1 million in 15 years. If his investments earn 6% / year and he increases his investments by 10% / year, how much does he need to invest the first year for his investments to be worth \$1 million in 15 years. (*remember: the answer you are seeking is usually data provided so this requires an indirect solution*).

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

ANSWER \_\_\_\_\_

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

ANSWER \_\_\_\_\_

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

**Solution – problem 9**

- One way to get an initial amount to try is to divide the total to be accumulated by the years available. In this case, it would be  $1000000 / 15 = 66666.66$ . He rounds it to 60000 to start

number entered	key to press
60000	Green Annual amount
10	Green % Increase / yr
15	Green Years
6	Tri-color ROR
	Green Replacement \$
press	Green Future amount

- Using 60000, the result is 26710434.90. This is almost 3 times the specified future amount. We recommend trying an amount that is 1/3 of this (20000)

number entered	key to press
20000	Green Annual amount
10	Green % Increase / yr
15	Green Years
6	Tri-color ROR
	Green Replacement \$
press	Green Future amount

- Using 20000, the result is 890344.98. This is around 10% below the specified future amount  
Since this is slightly BELOW the desired result, it is recommended to increase the annual amount used by 10% (2000) until the future amount produced equals the 1000000 desired.
- Using 22000, the result is 979379.48
- Using 24000, the result is 1068413.90.  
Since the future amount between these two amount, we know that the annual amount invested is between 22000 and 24000. If a more accurate amount is desired, you could try amounts in increments of 100 or 500 until the future amount calculated is 1000000.

**Problem 10:**

Pam can save \$3000 a year now. It would be fairly easy for her to increase her savings by 3% / year, but she would have to give up some things that are important to increase her savings by 10% / year. She expects retirement to last 20 years and wants to be able to increase her withdrawals 3% / year throughout retirement if she assumes a 5% rate of return through retirement. She wants to know how much more she would be able to spend in retirement if she increased her investments each year for the next 25 years by 10% instead of 3%, assuming her investments earned an average rate of return of 7% / year.

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

ANSWER \_\_\_\_\_

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

ANSWER \_\_\_\_\_

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

**Solution – problem 10**

- Step 1: calculate how much she would accumulate in 25 years with 3% and 10% increases.

Increase savings 3% / year

number entered	key to press
3000	Green Annual amount
3	Green % Increase / yr
25	Green Years
7	Tri-color ROR
	Green Replacement \$
press	Green Future amount

Increase savings 10% / year

number entered	key to press
3000	Green Annual amount
10	Green % Increase / yr
25	Green Years
7	Tri-color ROR
	Green Replacement \$
press	Green Future amount

**ANSWER : 250024.1**

**ANSWER : 540727.33**

- Step 2: Subtract the value in step 1 from each of the values

**ANSWER : 290703.23**

Using difference as retirement amount

number entered	key to press
290703.23	Blue retirement funds
3	Blue % Increase / yr
20	Blue Years
7	Tri-color ROR
press	Blue Yr 1 spending

**ANSWER : 17341.93 of extra income (in first year)**

**Problem 11:**

Assuming her investments earned 7% and she invested \$2000 each year for retirement during the next 20 years, Michelle wants to know how much this would allow her to spend in retirement (lasting 30 years) each year, assuming no increase in the annual withdrawal during retirement, and how much that would be worth in current dollars assuming an inflation rate of 3% during the 20 years between now and retirement..

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

ANSWER \_\_\_\_\_

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

ANSWER \_\_\_\_\_

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

**Solution – problem 11**

- Calculate how much the savings would be worth after 20 years
- Calculate the allowable withdrawal over 30 years as of 20 years from now
- Calculate what that withdrawal would be worth in current dollars.

Calculate value of savings

number entered	key to press
2000	Green Annual amount
0	Green % Increase / yr
20	Green Years
7	Tri-color ROR
	Green Replacement \$
press	Green Future amount

**ANSWER : 81990.98**  
 future amount)  
 (enter as blue, retirement funds)

Calculate first year withdrawal

number entered	key to press
81990.98	Blue retirement funds
0	Blue % Increase / yr
30	Blue Years
7	Tri-color ROR
press	Blue Yr 1 spending

**ANSWER : 6175.10** (enter as red,

Calculate first year withdrawal in current dollars  
 (remember, with red keys, inflation is entered using ROR key)

number entered	key to press
6175.10	Red future amount
20	Red yrs to received
3	Tri-color ROR
press	Red current value

**ANSWER : 3419.00**

**Problem 12.**

Kerry figures she can save \$2000 / year if she buys a used car instead of a new car. If she did that over 20 years, and invested the \$2000 savings each year at 8%, how much would she have accumulated?

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

ANSWER \_\_\_\_\_

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

ANSWER \_\_\_\_\_

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

**Solution – problem 12**

number entered	key to press
2000	Green Annual amount
0	Green % Increase / yr
20	Green Years
8	Tri-color ROR
	Green Replacement \$
press	Green Future amount

**ANSWER : 91523.93**

**Problem 13:**

Jim does not NEED his social security for current expenses. He needs to decide whether to take social security at 62 or 65. If he takes it at 62, he will get \$800 / month. If he takes it at 65, he will get \$1000 / month. He believes his social security benefits will increase 2% / year. If he expects to live to 80, he wants to know which is the best choice if he assumes a rate of return of 7% for comparison.

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

ANSWER \_\_\_\_\_

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

ANSWER \_\_\_\_\_

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

**Solution – Problem 13**

- At 62, he would have 18 years of benefits at a rate of \$9600 / year
- At 65 he would have 15 years of benefits at a rate of \$12000 / year
- The value we seek is the amount that would need to be invested at age 62 to generate the projected benefits. For that we need to discount the age 65 results to 3 years earlier (at age 62)

Results for age 62

number entered	key to press
9600	Green Annual amount
2	Green % Increase / yr
18	Green Years
7	Tri-color ROR
press	Green Replacement \$
	Green Future amount

**ANSWER : 118627.93**

Results for age 65

number entered	key to press
12000	Green Annual amount
2	Green % Increase / yr
15	Green Years
7	Tri-color ROR
press	Green Replacement \$
	Green Future amount

**ANSWER: 131531.77** (enter as red, future value)

Calculate amount to invest at 62 to equal age 65 benefits

number entered	key to press
131531.77	Red future amount
3	Red yrs to received
7	Tri-color ROR
press	Red current value

**ANSWER : 107369.10**

**Based on these calculations, benefits starting at age 62 are worth \$118,627.93, while benefits starting at age 65 are worth \$107,369.10 in age 62 dollars.**

**Problem 14:**

Charlotte has \$2 million dollars for retirement and expects to live 20 years. She has 3 children and wants to know how much she can afford to spend a year if she also wants \$250,000 to be left to each of her 3 children (\$750,000 total) at the end of 20 years. She assumes an increase in withdrawals of 4% / year, and a rate of return on investments of 5% / year.

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

ANSWER \_\_\_\_\_

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

ANSWER \_\_\_\_\_

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

**Solution – Problem 14**

- Step 1: calculate amount that needs to be invested now at 5%, to be worth \$750,000 (\$250,000 x 3) in 20 years and subtract from the \$2 million

number entered	key to press
750000	Red future amount
20	Red yrs to received
5	Tri-color ROR
press	Red current value

**ANSWER :** 282667.11 needs to be invested now (at 5%) to be worth \$750,000 in 20 years  
 (Balance: \$2,000,000 – 282667.11 = 1717332.89)

- Step 2: year 1 withdrawal based on balance (1717332.89) left after monies are set aside to provide for the future \$750,000

number entered	key to press
1717332.89	Blue retirement funds
4	Blue % Increase / yr
20	Blue Years
5	Tri-color ROR
press	Blue Yr 1 spending

**ANSWER :** 93895.58

**Problem 15:**

Charlie and Dottie want to save enough money to provide for their new child's college costs (4 years). The money will be needed in 18 years. Current costs are \$8000 and are estimated to increase 7% / year. If they invest \$3000 / year, assuming the money earns 7%, will they have enough by the time their child is 18?

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

ANSWER \_\_\_\_\_

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

ANSWER \_\_\_\_\_

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

**Solution – Problem 15**

- Step 1: Calculate how much they would need in 18 years to have enough to pay for the 4 years

Calculate first year college cost

number entered	key to press
8000	Yellow current amount
7	Yellow % increase / yr
18	Yellow years
press	Yellow future amount

calculate 4 yr cost as of yr 1

number entered	key to press
27039.46	Green Annual amount
7	Green % Increase / yr
4	Green Years
7	Tri-color ROR
press	Green Replacement \$
	Green Future amount

**ANSWER : 27039.56**

(enter as green, annual amount)

**ANSWER : 108157.84**

- Step 2: Calculate what the \$3000 invested per year would be worth in 18 years

number entered	key to press
3000	Green Annual amount
0	Green % Increase / yr
18	Green Years
7	Tri-color ROR
	Green Replacement \$
press	Green Future amount

**ANSWER : 101997.01**

(they would be about \$6000 short of the total needed.)

**Problem 16:**

Joe's parents invested money for him throughout his childhood. He is now 25 years old, and those investments are worth \$400,000. He's been reading about risk / return relationships and wants to know what his investment would be worth by age 60 if it earned 2% / year, 5% / year, or 8% / year.

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

ANSWER \_\_\_\_\_

**Solution – Problem 16**

- Joe's has 35 years between now and age 60.

Accumulated value at 2%

number entered	key to press
400000	Yellow current amount
2	Yellow % increase / yr
35	Yellow years
press	Yellow future amount

**ANSWER : 799955.82**

Accumulated value at 5%

number entered	key to press
400000	Yellow current amount
5	Yellow % increase / yr
35	Yellow years
press	Yellow future amount

**ANSWER : 2206406.10**

Accumulated value at 8%

number entered	key to press
400000	Yellow current amount
8	Yellow % increase / yr
35	Yellow years
press	Yellow future amount

**ANSWER : 5914137.70**

**Now he just needs to decide how much risk he is willing to take for \$5 million or so ...**

**Problem 17:**

Jeremy is 25 and just got his first social security report. It shows that at 67 (42 years from now) his monthly social security benefit will be \$1800 / month. He wants to know what that would be worth in today's dollars if he assumes an inflation rate of 5% / year.

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

ANSWER \_\_\_\_\_

**Solution – Problem 17**

number entered	key to press
1800	Red future amount
42	Red yrs to received
5	Tri-color ROR
press	Red current value

**ANSWER : 231.91**

**Problem 18:**

Bob's investment plan consists of \$5000 a year for 10 years, then \$10,000 a year for 10 years, then \$20,000 for 10 years. He wants to know how much he should have in 30 years if he assumes his investments will earn 6% / year.

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

ANSWER \_\_\_\_\_

**Solution – Problem 18**

There are several ways this calculation can be done. This solution calculates the future amount of each separate group of amounts, then projects the future value over the years left to 30 years.

- \$5000 for years 1-10 leaves 20 years for it to grow
- \$10,000 for years 11-20 leaves 10 years for it to grow
- \$20,000 for years 21-30 brings Bob to the total 30 years

5000 for 10 years

number entered	key to press
5000	Green Annual amount
0	Green % Increase / yr
10	Green Years
6	Tri-color ROR
	Green Replacement \$
press	Green Future amount

**ANSWER : 65903.97**

(enter this as yellow, current amount)

left to grow 20 yrs more.

number entered	key to press
65903.97	Yellow current amount
6	Yellow % increase / yr
20	Yellow years
press	Yellow future amount

**ANSWER : 211362.95**

10000 for 10 years (start yr 11)

number entered	key to press
10000	Green Annual amount
0	Green % Increase / yr
10	Green Years
6	Tri-color ROR
	Green Replacement \$
press	Green Future amount

**ANSWER : 131807.94**

(enter this as yellow, current amount)

left to grow 10 yrs (30 yr total)

number entered	key to press
131807.94	Yellow current amount
6	Yellow % increase / yr
20	Yellow years
press	Yellow future amount

**ANSWER : 236047.94**

5000 for 10 years (start year 20 through yr 30)

number entered	key to press
20000	Green Annual amount
0	Green % Increase / yr
10	Green Years
6	Tri-color ROR
	Green Replacement \$
press	Green Future amount

**ANSWER : 263615.89**

**Add the three 30 year amounts:**

$$\begin{aligned}
 &211362.95 \\
 &+ 236047.94 \\
 &+ \underline{263615.89} \\
 &= \underline{711026.78}
 \end{aligned}$$

**Problem 19:**

Ron and Sue expect to live 35 years in retirement. Recognizing that their health may not always be as good as it is now, they want to plan for 20 years of very active retirement with lots of travel and golf and such, then cut back for the following 15 years. They want to know how much money they would need to invest, assuming a 6% rate of return, to generate \$60,000 / year with a 5% cost of living increase for the first 20 years, then \$35,000 a year (in current dollars) for the following 15 years.

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

ANSWER \_\_\_\_\_

**Solution – Problem 19**

- Calculate amount needed to finance the first 20 years
- Calculate the equivalent of \$35,000 today 20 years from now
- Calculate amount needed to finance the following 15 years of \$35,000, adjusted for inflation
- Calculate future amount needed in current dollars

To finance \$60,000 for 20 yrs

number entered	key to press
60000	Green Annual amount
5	Green % Increase / yr
20	Green Years
6	Tri-color ROR
press	Green Replacement \$
	Green Future amount

**ANSWER : 1098303.50**

To finance last 15 years  
Adjusted for inflation

number entered	key to press
92865.42	Green Annual amount
5	Green % Increase / yr
15	Green Years
6	Tri-color ROR
press	Green Replacement \$
	Green Future amount

**ANSWER : 1304648.28**

(enter as red future amount)

\$35000 equivalent 20 years later

number entered	key to press
35000	Yellow current amount
5	Yellow % increase / yr
20	Yellow years
press	Yellow future amount

**ANSWER: 92865.42**

invest today to have funds for  
last 15 years

number entered	key to press
1304648.28	Red future amount
20	Red yrs to received
6	Tri-color ROR
press	Red current value

**ANSWER: 406795.50**

$$\begin{aligned}
 & 1098303.50 \text{ (amount needed for 20 years)} \\
 & + 406795.50 \text{ (amount needed for next 15 years)} \\
 & = 1505099.00 \text{ (total needed)}
 \end{aligned}$$

**Problem 20:**

Carlos wants to invest enough money today to leave \$10 million for his future grandchildren 100 years from now. If he assumes the money he invests will earn 5% / year, how much would he need to invest?

Solution:

number entered	key to press
	Yellow current amount
	Yellow % increase / yr
	Yellow years
	Yellow future amount

number entered	key to press
	Red future amount
	Red yrs to received
	Tri-color ROR
	Red current value

ANSWER \_\_\_\_\_

ANSWER \_\_\_\_\_

number entered	key to press
	Blue retirement funds
	Blue % Increase / yr
	Blue Years
	Tri-color ROR
	Blue Yr 1 spending

number entered	key to press
	Green Annual amount
	Green % Increase / yr
	Green Years
	Tri-color ROR
	Green Replacement \$
	Green Future amount

ANSWER \_\_\_\_\_

ANSWER \_\_\_\_\_

**Solution – Problem 20**

number entered	key to press
10000000	Red future amount
100	Red yrs to received
5	Tri-color ROR
press	Red current value

**ANSWER : 76044.90**

*For questions, comments, recommendations:*

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