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Assignment 1

Question 2: Present and Future Values:

1. Her costs for her senior year in college will be **$14,292**. This answer was derived from the future value formula provided in the text. This formula multiplies $12,000, this year’s total cost, to 1 plus 6, the rising percentage amount, and then brought to the third power, because the future value is calculated three years later. The answer comes to $14,292. Another way to derive this answer is to use the provided table in the Appendix A-1. You look to the “6 percent” column and the “3 year” row, and the intersecting number is 1.1910. You then multiply this number and $12,000, this year’s total cost, which equals $14,292.
2. The scholarship is worth **$4,854.50** in today’s dollars. This answer was derived from the present value formula provided in the text. This formula divides the future value of the scholarship, which is $5000, by 10 plus the inflation rate, which is 3. This number is then brought to the first power because it is the number of years the present value is invested, which is 1 year. The answer comes to $4,854.50. Another way to derive this answer is to use the provided table in the Appendix A-2. You look to the “3 percent” column because this is the inflation rate and then look to the “1 year” row because this is the amount of time the present value is invested. The intersecting number is 0.9709. You then multiply this number and $5,000, the future value, which equals $4,854.50.
3. The value of the fund after three years will be **$7,640.64**. This answer was derived from the future value formula with series of equal amounts provided in the text. This formula adds 1 and 6, the interest rate per a year. This is then raised to the 3rd power, indicating the amount of years the present value, $2,400, is invested. Then 1 is subtracted from this number, and then multiplied by $2,400, the amount of the annuity. Finally, this number is then divided by 6, the interest rate per a year. The answer comes to $7,640.64. Another way to derive this answer is to use the provided table in the Appendix A-3. You look to the “6 percent” column because this is the interest rate per a year and then look to the “3 year” row because this is the amount of time the present value is invested. The intersecting number is 3.1836. You then multiply this number and $2,400, the present value, which equals $7,640.64
4. The present value of the stream of payments is **$2,673**. This answer was derived from the present value formula with series of equal amounts provided in the text. This formula adds 1 and 6, which is the interest rate per a year, and then raises this number to 3, because this is the number of years the present value is invested. Then, 1 is divided by this number, and then subtracted from 1. Then, you multiply your answer and 1000, because this is the amount of the annuity. Finally, divide this number by 6, which is the interest rate per a year. The answer comes to $2,673. Another way to derive this answer is to use the provided table in the Appendix A-4. You look to the “6 percent” column because this is the annual interest rate for the stream of payments,” and then you look to the “3 year” row because this is the amount of time the present value is invested. The intersecting number is 2.6730. You then multiply this number and $1000, the amount of the gift each year, which equals $2,673.

Question 3: Present and Future Values:

1. The future value of $400 in two years that earns 5 percent is **$441**. This answer was derived by using the table in Appendix A-1, the future value of a single amount. The amount of time is two years, so you would look down the column for 2, and then the percent of interest is 5, so you would look across the row for 5. Then you find the intersecting number between these two, which is 1.1025. You then multiply $400, which is the present value, and 1.1025, and this equals $441.
2. The future value of $1,200 saved each year for ten years that earning 7 percent is **$16,579.68**. This answer was derived by using the table in Appendix A-3, the future value of a series of equal amounts. The amount of time is 10 years, so you would look down the column for 10, and then the percent of interest is 7, so you would look across the row for 7. Then you find the intersecting number between these two, which is 13.8164. You then multiply $1,200, which is the present value of the series of equal amounts, and 13.8164, and this equals $16,579.68.
3. The amount a person would need to deposit today with a 5 percent interest rate to have $2000 in three years is **$1,727.60**. This answer was derived by using the table in Appendix A-2, the present value of a single amount. The amount of time is 3 years, so you would look down the column for 3, and then the percent of interest is 5, so you would look across the row for 5. Then you would find the intersecting number between these two, which is 0.8638. You then multiply $2,000, which is the future value, and 0.8638, and this equals $1,727.60.
4. The amount a person would need to deposit today to be able to withdraw $6,000 each year for ten years from an account earning 6 percent is **$44,160.60**. This answer was derived by using the table in Appendix A-4, the present value of a series of equal amounts. The amount of time is 10 years, so you would look down the column for 10, and then the percent of interest is 6, so you would look across the row for 6. Then you would find the intersecting number between these two, which is 7.3601. You then multiply $6,000, the amount of money that will be withdrawn each year, and 7.3601, and this equals $44,160.60.
5. The better choice between the gifts of $5,000 now or $8,000 five years from now, if the funds earned 8 percent interest over the next five years, would be the **$8,000 five years from now.** First, I calculated the true money value over time of the $5,000 gift. This answer was derived by using the table in Appendix A-1, the future value of a single amount. The amount of time is 5 years, so you would look down the column for 5, and then the percent of interest is 8, so you would look across the row for 8. Then you would find the intersecting number between these two, which is 1.4693. You then multiply $5,000 and 1.4693, and this equals $7,346.50. Then, I calculated the true money value over time of the $8,000 gift. This answer was derived by using the table in Appendix A-2, the present value of a single amount. The amount of time is 5 years, so you would look down the column for 5, and then the percent of interest is 8, so you would look across the row for 8. Then you would find the intersecting number between these two, which is 0.6806. You then multiply $8,000 and 0.6806, and this equals $5,444.80. The $8,000 is worth more in its future value and its present value than the $5,000, therefore making the $8,000 option a better one.
6. The lump sum that should be invested now if someone wants to have $3,000 available to spend four years from now with a 7 percent interest rate is **$2,288.70**. This answer was derived by using the table in Appendix A-2, the present value of a single amount. The amount of time is 4 years, so you would look down the column for 4, and then the percent of interest is 7, so you would look across the row for 7. Then you would find the intersecting number between these two, which is 0.7629. You then multiply $3,000, the future value, and 0.7629, and this equals $2,288.70.
7. The difference between someone investing $1,200 each year with a 9 percent interest for 15 years and someone investing $1,200 each year with a 10 percent interest for 15 years is **$2,893.92.** This answer was derived by using the table in Appendix A-3, the future value of a series of equal amounts. I first calculated the investment with the 9 percent interest rate. The amount of time is 15 years, so you would look down the column for 15, and then the percent of interest is 9, so you would look across the row for 9. Then you would find the intersecting number between these two, which is 29.3609. You then multiply $1,200, the amount being invested each year, and 29.3609, and this equals $35,233.08. Then I calculated the investment with the 10 percent interest rate. The amount of time is 15 years, so you would look down the column for 15, and then the percent of interest is 10, so you would look across the row for 10. Then you would find the intersecting number between these two, which is 31.7725. You then multiply $1,200, the amount being invested each year, and 31.7725, and this equals $38,127.00. Then, I subtracted the investment with the 9 percent from the investment with the 10 percent, and the difference in the return is $2,893.92.
8. If a person invests $50,000 in an investment that earns 6 percent, and $6,000 is withdrawn each year, then it will take **7 years** for the funds to run out. This answer was derived by using the table in Appendix A-3, the future value of a series of equal amounts. I first divided $6,000, the amount withdrawn each year, into $50,000, the amount invested in the beginning, which equals 8.3333. Then, I looked under the “6 percent” column and found a number close to 8.3333 which was 8.3938. I followed this number to the corresponding year number which was 7. This means it will take 7 years for the funds to run out if $6,000 is withdrawn each year from the $50,000 investment earning 6 percent interest.

Question 4: Rule of 72:

1. To double $1000 to $2000 with a 2 percent interest rate will take **36 years.** Using the Rule of 72, you divide the interest rate into the number 72. By dividing 2 into 72, the answer equals 36, which means it will take 36 years for $1000 to double into $2000.
2. To double $1000 to $2000 with a 4 percent interest rate will take **18 years.** Using the Rule of 72, you divide the interest rate into the number 72. By dividing 4 into 72, the answer equals 18, which means it will take 18 years for $1000 to double into $2000.
3. To double $1000 to $2000 with a 6 percent interest rate will take **12 years.** Using the Rule of 72, you divide the interest rate into the number 72. By dividing 6 into 72, the answer equals 12, which means it will take 12 years for $1000 to double into $2000.
4. To double $1000 to $2000 with an 8 percent interest rate will take **9 years.**  Using the Rule of 72, you divide the interest rate into the number 72. By dividing 8 into 72, the answer equals 9, which means it will take 9 years for $1000 to double into $2000.
5. To double $1000 to $2000 with a 10 percent interest rate will take **7.2 years.**  Using the Rule of 72, you divide the interest rate into the number 72. By dividing 10 into 72, the answer equals 7.2, which means it will take 7.2 years for $1000 to double into $2000.