



COMPOUND INTEREST & TIME VALUE OF MONEY

Answer Key - PAGE 1

Mr. A - Invests \$50,000 total, starting age 22, stops at age 41

Age	Investment	New Balance	P+I
22	\$2,500.00	\$2,500.00	\$2,675.00
23	\$2,500.00	\$5,175.00	\$5,537.25
24	\$2,500.00	\$8,037.25	\$8,599.86
25	\$2,500.00	\$11,099.86	\$11,876.85
26	\$2,500.00	\$14,376.85	\$15,383.23
27	\$2,500.00	\$17,883.23	\$19,135.05
28	\$2,500.00	\$21,635.05	\$23,149.51
29	\$2,500.00	\$25,649.51	\$27,444.97
30	\$2,500.00	\$29,944.97	\$32,041.12
31	\$2,500.00	\$34,541.12	\$36,959.00
32	\$0	\$39,459.00	\$42,221.13
33	\$0	\$44,721.13	\$47,851.61
34	\$0	\$50,351.61	\$53,876.22
35	\$0	\$56,376.22	\$60,322.56
36	\$0	\$62,822.56	\$67,220.13
37	\$0	\$69,720.13	\$74,600.54
38	\$0	\$77,100.54	\$82,497.58
39	\$0	\$84,997.58	\$90,947.41
40	\$0	\$93,447.41	\$99,988.73
41	\$0	\$102,488.73	\$109,662.94



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42	\$0	\$109,662.94	\$117,339.35
43	\$0	\$117,339.35	\$125,553.10
44	\$0	\$125,553.10	\$134,341.82
45	\$0	\$134,341.82	\$143,745.75
46	\$0	\$143,745.75	\$153,807.95
47	\$0	\$153,807.95	\$164,574.51
48	\$0	\$164,574.51	\$176,094.72
49	\$0	\$176,094.72	\$188,421.35
50	\$0	\$188,421.35	\$201,610.85
51	\$0	\$201,610.85	\$215,723.61
52	\$0	\$215,723.61	\$230,824.26
53	\$0	\$230,824.26	\$246,981.96
54	\$0	\$246,981.96	\$264,270.69
55	\$0	\$264,270.69	\$282,769.64
56	\$0	\$282,769.64	\$302,563.52
57	\$0	\$302,563.52	\$323,742.96
58	\$0	\$323,742.96	\$346,404.97
59	\$0	\$346,404.97	\$370,653.32
60	\$0	\$370,653.32	\$396,599.05
61	\$0	\$396,599.05	\$424,360.98
62	\$0	\$424,360.98	\$454,066.25
63	\$0	\$454,066.25	\$485,850.89
64	\$0	\$485,850.89	\$519,860.45
65	\$0	\$519,860.45	\$556,250.68



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Total Investment \$50,000.00

How much does Mr. A invest in total? (This is the principal.)

\$50,000

How many years does he invest? ___20 years___

Where does all the other money come from? _Interest_(or what his money earns)

How much money has his investment earned over the years?

\$506,250.68

How much does Mr. A have at age 65, even though he stopped investing money at age 41? \$556,250.68

In this next example, Mr. A begins investing at age 22 and continues to invest \$2,500 a year, each year, until he turns 65.

Mr. A - Invests \$2,500 annually from age 22 - 65

Age	Investment	New Balance	P+I
22	\$2,500.00	\$2,500.00	\$2,675.00
23	\$2,500.00	\$5,175.00	\$5,537.00
24	\$2,500.00	\$8,037.25	\$8,599.86
25	\$2,500.00	\$11,099.86	\$11,876.85
26	\$2,500.00	\$14,376.85	\$15,383.23
27	\$2,500.00	\$17,883.23	\$19,135.05



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28	\$2,500.00	\$21,635.05	\$23,149.51
29	\$2,500.00	\$25,649.51	\$27,444.97
30	\$2,500.00	\$29,944.97	\$32,041.12
31	\$2,500.00	\$34,541.12	\$36,959.00
32	\$2,500.00	\$39,459.00	\$42,221.13
33	\$2,500.00	\$44,721.13	\$47,851.61
34	\$2,500.00	\$50,351.61	\$53,876.22
35	\$2,500.00	\$56,376.22	\$60,322.56
36	\$2,500.00	\$62,822.56	\$67,220.13
37	\$2,500.00	\$69,720.13	\$74,600.54
38	\$2,500.00	\$77,100.54	\$82,497.58
39	\$2,500.00	\$84,997.58	\$90,947.41
40	\$2,500.00	\$93,447.41	\$99,988.73
41	\$2,500.00	\$102,488.73	\$109,662.94
42	\$2,500.00	\$112,162.94	\$120,014.35
43	\$2,500.00	\$122,514.35	\$131,090.35
44	\$2,500.00	\$133,590.35	\$142,941.68
45	\$2,500.00	\$145,441.68	\$155,622.59
46	\$2,500.00	\$158,122.59	\$169,191.18
47	\$2,500.00	\$171,691.18	\$183,709.56
48	\$2,500.00	\$186,209.56	\$199,244.23
49	\$2,500.00	\$201,744.23	\$215,866.32
50	\$2,500.00	\$218,366.32	\$233,651.97
51	\$2,500.00	\$236,151.97	\$252,682.60



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52	\$2,500.00	\$255,182.60	\$273,045.39
53	\$2,500.00	\$275,545.39	\$294,833.56
54	\$2,500.00	\$297,333.56	\$318,146.91
55	\$2,500.00	\$320,646.91	\$343,092.20
56	\$2,500.00	\$345,592.20	\$369,783.65
57	\$2,500.00	\$372,283.65	\$398,343.51
58	\$2,500.00	\$400,843.51	\$428,902.55
59	\$2,500.00	\$431,402.55	\$461,600.73
60	\$2,500.00	\$464,100.73	\$496,587.78
61	\$2,500.00	\$499,087.78	\$534,023.92
62	\$2,500.00	\$536,523.92	\$574,080.60
63	\$2,500.00	\$576,580.60	\$616,941.24
64	\$2,500.00	\$619,441.24	\$662,802.13
65	\$2,500.00	\$665,302.13	\$711,873.28

Total Investment \$110,000.00

In this example, Mr. A continues to invest \$2,500 every year, beginning at age 22 until he turns 65. Rate of return remains the same, 7% each year.

How much is his principal investment? \$110,000

How many years does he invest? 44 years

How much has his money earned over these years? \$601,873.28

How much more money does Mr. A have at 65 in this example than he does in the first example, where he only invests from age 22-41? \$155,622.60



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Mrs. B

Ms. B thinks she can't afford to invest when she's just beginning her career; therefore, she waits until she's more established. When she turns 40, though, she realizes that it's time. Now making more money, she is able to invest \$5000/year, which she does for 10 years.

She, like Mr. B, invests a total of \$50,000, earning a 7% annual rate of return.

Ms. B - Invests \$50,000 total, starting age 40, stops at age 49

Age	Investment	New Balance	P+I
40	\$5,000.00	\$5,00.00	\$5,350.00
41	\$5,000.00	\$5,000.00	\$5,350.00
		\$10,350.00	\$11,074.50
42	\$5,000.00	\$16,074.50	\$17,199.72
43	\$5,000.00	\$22,199.72	\$23,753.70
44	\$5,000.00	\$28,753.70	\$30,766.45
45	\$5,000.00	\$35,766.45	\$38,270.11
46	\$5,000.00	\$43,270.11	\$46,299.01
47	\$5,000.00	\$51,299.01	\$54,889.94
48	\$5,000.00	\$59,889.94	\$64,082.24
49	\$5,000.00	\$69,082.24	\$73,918.00
50	\$0	\$73,918.00	\$79,092.26
51	\$0	\$79,092.26	\$84,628.71
52	\$0	\$84,628.71	\$90,552.72
53	\$0	\$90,552.72	\$96,891.42
54	\$0	\$96,891.42	\$103,673.81



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55	\$0	\$103,673.81	\$110,930.98
56	\$0	\$110,930.98	\$118,696.15
57	\$0	\$118,696.15	\$127,004.88
58	\$0	\$127,004.88	\$135,895.22
59	\$0	\$135,895.22	\$145,407.89
60	\$0	\$145,407.89	\$155,586.44
61	\$0	\$155,586.44	\$166,477.49
62	\$0	\$166,477.49	\$178,130.91
63	\$0	\$178,130.91	\$190,600.08
64	\$0	\$190,600.08	\$203,942.08
65	\$0	\$203,942.08	\$218,218.03

Total Investment \$50,000.00

How many years does she invest? 10 years

How much does Ms. B's money earn above her principal? \$168,218.03

Who has more money from their \$50,000 investment, Mr. A or Ms. B? Mr. A.

Why? Mr. A made more money because his money had more time to allow compound interest to work for him. (More TIME is the key to the answer.)



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In this next example, Ms. B continues to invest \$5,000 a year, from age 40 – 65.

Ms. B - Invests \$5,000 annually from age 40-65

Age	Investment	New Balance	P+I
40	\$5,000.00	\$5,000.00	\$5,350.00
41	\$5,000.00	\$10,350.00	\$11,074.50
42	\$5,000.00	\$16,074.50	\$17,199.72
43	\$5,000.00	\$22,199.72	\$23,753.70
44	\$5,000.00	\$28,753.70	\$30,766.45
45	\$5,000.00	\$35,766.45	\$38,270.11
46	\$5,000.00	\$43,270.11	\$46,299.01
47	\$5,000.00	\$51,299.01	\$54,889.94
48	\$5,000.00	\$59,889.94	\$64,082.24
49	\$5,000.00	\$69,082.24	\$73,918.00
50	\$5,000.00	\$78,918.00	\$84,442.26
51	\$5,000.00	\$89,442.26	\$95,703.21
52	\$5,000.00	\$100,703.21	\$107,752.44
53	\$5,000.00	\$112,752.44	\$120,645.11
54	\$5,000.00	\$125,645.11	\$134,440.27
55	\$5,000.00	\$139,440.27	\$149,201.09
56	\$5,000.00	\$154,201.09	\$164,995.16
57	\$5,000.00	\$169,995.16	\$181,894.82



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58	\$5,000.00	\$186,894.82	\$199,977.46
59	\$5,000.00	\$204,977.46	\$219,325.88
60	\$5,000.00	\$224,325.88	\$240,028.70
61	\$5,000.00	\$245,028.70	\$262,180.70
62	\$5,000.00	\$267,180.70	\$285,883.35
63	\$5,000.00	\$290,883.35	\$311,245.19
64	\$5,000.00	\$316,245.19	\$338,382.35
65	\$5,000.00	\$343,382.35	\$367,419.12

Total Investment \$130,000.00

How much does her money make over these years? \$237,419.12

How much more money did Ms. B invest in this example than she did when she stopped investing at age 49? \$80,000

How much more money does Ms. B have at age 65 in this example than she did when she stopped investing at age 49? \$149,200.82

How much of that additional money is principal? \$80,000

How much of that additional money is interest? \$69,200.82

So is her additional money more principal or interest? More principal.

Why? Because she didn't have much TIME to allow interest to accrue.



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In this next example, Ms. B postpones savings for an additional 10 years, and doesn't begin saving until she turns 50. She invests \$5,000 per year, from age 50 – 65.

Ms. B - Invests \$5,000 annually from age 50-65

Age	Investment	New Balance	P+I
50	\$5,000.00	\$5,000.00	\$5,350.00
51	\$5,000.00	\$10,350.00	\$11,074.50
52	\$5,000.00	\$16,074.50	\$17,199.72
53	\$5,000.00	\$22,199.72	\$23,753.70
54	\$5,000.00	\$28,753.70	\$30,766.45
55	\$5,000.00	\$35,766.45	\$38,270.11
56	\$5,000.00	\$43,270.11	\$46,299.01
57	\$5,000.00	\$51,299.01	\$54,889.94
58	\$5,000.00	\$59,889.94	\$64,082.24
59	\$5,000.00	\$69,082.24	\$73,918.00
60	\$5,000.00	\$78,918.00	\$84,442.26
61	\$5,000.00	\$89,442.26	\$95,703.21
62	\$5,000.00	\$100,703.21	\$107,752.44
63	\$5,000.00	\$112,752.44	\$120,645.11
64	\$5,000.00	\$125,645.11	\$134,440.27
65	\$5,000.00	\$139,440.27	\$149,201.09



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How much money does Ms. B end up with at age 65 in this example? \$149,201.09

How much interest has her money earned over these years? \$ 69,201.09

How much less money does she have in this example than in her first investing example?
\$69,016.94

How much less money does she have in this example than in her second investing
example? \$218,218.03

What is working against Ms. B? Time (or the time value of money)

Which plan would you recommend to Ms. B? Plan 2 – invest \$5,000 per year from age 40-
65. Or better yet...she should be more like Mr. A.

Based on these examples, what have you learned about saving for retirement? (or
savings in general.) What would you recommend to yourself, your friends, or your family?

Answers will vary but should say something about the fact that it's much better to start
saving early, even if you then STOP investing because your money will have much more
TIME to gain interest.