

Worksheet 21 (Finance 1): Spreadsheets and Interest

Group names: _____

1. Use a spreadsheet to calculate the following quantities:

(a) $471 + 5619 =$ _____

(b) $36 * 987 =$ _____

(c) $45^3 =$ _____ (Use syntax `=45^3`)

(d) $12! =$ _____ (Use syntax `=fact(12)`)

- (e) Use a spreadsheet to calculate your total bill if the dinner cost \$72.50 and you want to give an 18% tip. _____

471+5619	6090
36 * 987	35532
45^3	91125
18!	479001600
tip	\$85.55

2. Use a spreadsheet to calculate the following if you invested \$4500 for 10 years, assuming
- simple interest**
- . (Use the process from the lecture notes.)

(a) how much interest would be accrued if you invested 2%? \$900 total

(b) How much money did you have at the end of 10 years? \$5400

(c) How much interest would you accrue if you invested at 3%? \$1350

(d) How much money did you have at the end of 10 years? \$5850

(e) How much additional interest did you get in going from 2% to 3%? 450

3. Answer the previous question if you are using
- compound interest**
- (compounded annually) instead.

(a) how much interest would be accrued if you invested 2%? 985.47

(b) How much money did you have at the end of 10 years? 5485.37

(c) How much interest would you accrue if you invested at 3%? 1478.21

(d) How much money did you have at the end of 10 years? 5978.21

(e) How much additional interest did you get in going from 2% to 3%? \$492.74

simple interest		0.02	0.03
year	principal	interest	interest
1	4500	90	135
2		90	135
3		90	135
4		90	135
5		90	135
6		90	135
7		90	135
8		90	135
9		90	135
10		90	135
total		900	1350
grand total	5400		5850
			450

← total 3%

compound interest		\$0.02	\$0.03
year	principal	interest	interest
1	\$4,500.00	\$90.00	\$135.00
2	\$4,590.00	\$91.80	\$137.70
3	\$4,681.80	\$93.64	\$140.45
4	\$4,775.44	\$95.51	\$143.26
5	\$4,870.94	\$97.42	\$146.13
6	\$4,968.36	\$99.37	\$149.05
7	\$5,067.73	\$101.35	\$152.03
8	\$5,169.09	\$103.38	\$155.07
9	\$5,272.47	\$105.45	\$158.17
10	\$5,377.92	\$107.56	\$161.34
total		\$985.47	\$1,478.21
grand total	\$5,485.47		\$5,978.21
			\$492.74

← total 3%

4. Now we will make a more clever interest calculator.

- i. Make a new sheet in your spreadsheet, called **Interest**.
- ii. In A1 type **Simple Interest**
- iii. In row 2 make cells A through E contain the words
year principal interest total interest grand total
- iv. Start column A2 with 1 and then 2 and fill down until year 10.
- v. In C1 type 0.06 (this is where we are storing our interest)
- vi. Type 500 into B3
- vii. Type $=B\$3*C\1 into C3.
- viii. In D3 type $=\text{sum}(C\$3:C3)$.
- ix. In E3 type $=B\$3+D3$.
- x. Fill down C3, D3, E3 until year 10

To convert the long decimals to things that look like currency, you can click on the column header and then click the button that looks like \$ in the toolbar.

- (a) How much interest did you accrue in Year 10? 30
- (b) How much total money did you accrue in Year 10? 800
- (c) Fill down more columns if necessary. At what year will you have more than \$1200?
y 24
- (d) At what year will you have accrued more than \$500 in interest? y 17

5. Answer the previous questions assuming you invested \$825 at 2.75% interest using simple interest:

- (a) What two cells do you need to update to make this change?
Cell C1 should change to 0.0275
Cell B3 should change to 825
- (b) How much interest did you accrue in Year 10? 22.69
- (c) How much total money did you accrue in Year 10? 1051.88
- (d) Fill down more columns if necessary. At what year will you have more than \$1200?
y 17
- (e) At what year will you have accrued more than \$500 in interest? y 23

simple interest		\$0.06			
year	principal	interest	total interest	grand total	
1	500	\$30.00	\$30.00	\$530.00	
2		\$30.00	\$60.00	\$560.00	
3		\$30.00	\$90.00	\$590.00	
4		\$30.00	\$120.00	\$620.00	
5		\$30.00	\$150.00	\$650.00	
6		\$30.00	\$180.00	\$680.00	
7		\$30.00	\$210.00	\$710.00	
8		\$30.00	\$240.00	\$740.00	
9		\$30.00	\$270.00	\$770.00	
10		\$30.00	\$300.00	\$800.00	
11		\$30.00	\$330.00	\$830.00	
12		\$30.00	\$360.00	\$860.00	
13		\$30.00	\$390.00	\$890.00	
14		\$30.00	\$420.00	\$920.00	
15		\$30.00	\$450.00	\$950.00	
16		\$30.00	\$480.00	\$980.00	
17		\$30.00	\$510.00	\$1,010.00	
18		\$30.00	\$540.00	\$1,040.00	
19		\$30.00	\$570.00	\$1,070.00	
20		\$30.00	\$600.00	\$1,100.00	
21		\$30.00	\$630.00	\$1,130.00	
22		\$30.00	\$660.00	\$1,160.00	
23		\$30.00	\$690.00	\$1,190.00	
24		\$30.00	\$720.00	\$1,220.00	
25		\$30.00	\$750.00	\$1,250.00	
26		\$30.00	\$780.00	\$1,280.00	
27		\$30.00	\$810.00	\$1,310.00	

simple interest		2.75%			
year	principal	interest	total interest	grand total	
1	825	\$22.69	\$22.69	\$847.69	
2		\$22.69	\$45.38	\$870.38	
3		\$22.69	\$68.06	\$893.06	
4		\$22.69	\$90.75	\$915.75	
5		\$22.69	\$113.44	\$938.44	
6		\$22.69	\$136.13	\$961.13	
7		\$22.69	\$158.81	\$983.81	
8		\$22.69	\$181.50	\$1,006.50	
9		\$22.69	\$204.19	\$1,029.19	
10		\$22.69	\$226.88	\$1,051.88	
11		\$22.69	\$249.56	\$1,074.56	
12		\$22.69	\$272.25	\$1,097.25	
13		\$22.69	\$294.94	\$1,119.94	
14		\$22.69	\$317.63	\$1,142.63	
15		\$22.69	\$340.31	\$1,165.31	
16		\$22.69	\$363.00	\$1,188.00	
17		\$22.69	\$385.69	\$1,210.69	
18		\$22.69	\$408.38	\$1,233.38	
19		\$22.69	\$431.06	\$1,256.06	
20		\$22.69	\$453.75	\$1,278.75	
21		\$22.69	\$476.44	\$1,301.44	
22		\$22.69	\$499.13	\$1,324.13	
23		\$22.69	\$521.81	\$1,346.81	
24		\$22.69	\$544.50	\$1,369.50	
25		\$22.69	\$567.19	\$1,392.19	
26		\$22.69	\$589.88	\$1,414.88	
27		\$22.69	\$612.56	\$1,437.56	

6. We will next make a more clever compound interest calculator by copying the simple interest calculator and updating some cells.
- Select your simple interest spreadsheet cells, copy them, click on cell G1 and hit paste.
 - Change the title to **Compound Interest**
 - Change your cell values so I1 contains 0.06 and H3 contains 500.
 - Type $=H3*I\$1$ into I3.
 - Type $=H3+I3$ into H4.
 - Type $=H4*I\$1$ into I4.
 - Now select cells H4, I4 and fill them down. Columns J and K should update automatically.
 - If you like, select columns H, I, J, K and turn them into currency by clicking the \$ in the toolbar.

Answer the following questions about compound interest, investing \$500 compounded annually at a rate of 6%:

- How much interest did you accrue in Year 10? 50.68
 - How much total money did you accrue in Year 10? 895.42
 - How much more money did you accrue in Year 10 than from simple interest? \$125.42
 - Fill down more columns if necessary. At what year will you have more than \$1200? y 16
 - How did this answer differ from your simple interest answer? 1 year earlier
 - At what year will you have accrued more than \$500 in interest? y 12
 - How did this answer differ from your simple interest answer? 5 years earlier!
7. Now answer the previous questions about compound interest assuming you invested \$825 at 2.75% interest:
- What two cells do you need to update to make this change?
Cell I 1 should change to 0.0275
Cell H 2 should change to 825
 - How much interest did you accrue in Year 10? 28.96
 - How much total money did you accrue in Year 10? 1082.11
 - Fill down more columns if necessary. At what year will you have more than \$1200? y 14
 - At what year will you have accrued more than \$500 in interest? y 18

G	H	I	J	K
compound interest		6.00%		
year	principal	interest	total interest	grand total
1	\$500.00	\$30.00	\$30.00	\$530.00
2	\$530.00	\$31.80	\$61.80	\$561.80
3	\$561.80	\$33.71	\$95.51	\$595.51
4	\$595.51	\$35.73	\$131.24	\$631.24
5	\$631.24	\$37.87	\$169.11	\$669.11
6	\$669.11	\$40.15	\$209.26	\$709.26
7	\$709.26	\$42.56	\$251.82	\$751.82
8	\$751.82	\$45.11	\$296.92	\$796.92
9	\$796.92	\$47.82	\$344.74	\$844.74
10	\$844.74	\$50.68	\$395.42	\$895.42
11	\$895.42	\$53.73	\$449.15	\$949.15
12	\$949.15	\$56.95	\$506.10	\$1,006.10
13	\$1,006.10	\$60.37	\$566.46	\$1,066.46
14	\$1,066.46	\$63.99	\$630.45	\$1,130.45
15	\$1,130.45	\$67.83	\$698.28	\$1,198.28
16	\$1,198.28	\$71.90	\$770.18	\$1,270.18
17	\$1,270.18	\$76.21	\$846.39	\$1,346.39
18	\$1,346.39	\$80.78	\$927.17	\$1,427.17
19	\$1,427.17	\$85.63	\$1,012.80	\$1,512.80
20	\$1,512.80	\$90.77	\$1,103.57	\$1,603.57
21	\$1,603.57	\$96.21	\$1,199.78	\$1,699.78
22	\$1,699.78	\$101.99	\$1,301.77	\$1,801.77
23	\$1,801.77	\$108.11	\$1,409.87	\$1,909.87
24	\$1,909.87	\$114.59	\$1,524.47	\$2,024.47
25	\$2,024.47	\$121.47	\$1,645.94	\$2,145.94
26	\$2,145.94	\$128.76	\$1,774.69	\$2,274.69
27	\$2,274.69	\$136.48	\$1,911.17	\$2,411.17

compound interest		0.0275		
year	principal	interest	total interest	grand total
1	\$825.00	\$22.69	\$22.69	\$847.69
2	\$847.69	\$23.31	\$46.00	\$871.00
3	\$871.00	\$23.95	\$69.95	\$894.95
4	\$894.95	\$24.61	\$94.56	\$919.56
5	\$919.56	\$25.29	\$119.85	\$944.85
6	\$944.85	\$25.98	\$145.83	\$970.83
7	\$970.83	\$26.70	\$172.53	\$997.53
8	\$997.53	\$27.43	\$199.96	\$1,024.96
9	\$1,024.96	\$28.19	\$228.15	\$1,053.15
10	\$1,053.15	\$28.96	\$257.11	\$1,082.11
11	\$1,082.11	\$29.76	\$286.87	\$1,111.87
12	\$1,111.87	\$30.58	\$317.45	\$1,142.45
13	\$1,142.45	\$31.42	\$348.86	\$1,173.86
14	\$1,173.86	\$32.28	\$381.15	\$1,206.15
15	\$1,206.15	\$33.17	\$414.31	\$1,239.31
16	\$1,239.31	\$34.08	\$448.40	\$1,273.40
17	\$1,273.40	\$35.02	\$483.41	\$1,308.41
18	\$1,308.41	\$35.98	\$519.40	\$1,344.40
19	\$1,344.40	\$36.97	\$556.37	\$1,381.37
20	\$1,381.37	\$37.99	\$594.35	\$1,419.35
21	\$1,419.35	\$39.03	\$633.39	\$1,458.39
22	\$1,458.39	\$40.11	\$673.49	\$1,498.49
23	\$1,498.49	\$41.21	\$714.70	\$1,539.70
24	\$1,539.70	\$42.34	\$757.04	\$1,582.04
25	\$1,582.04	\$43.51	\$800.55	\$1,625.55
26	\$1,625.55	\$44.70	\$845.25	\$1,670.25
27	\$1,670.25	\$45.93	\$891.18	\$1,716.18