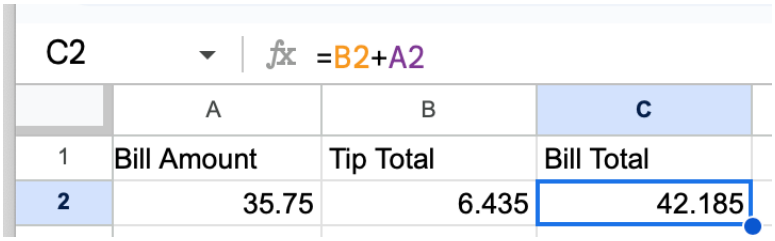
 Solutions

Introduction to Spreadsheets and Simple Interest

1. Getting started with spreadsheets.
   (a) Rectangles in spreadsheets are called *cells* and they are identified by their row (numbers) and column (letters) . The upper left rectangle is `A1`.
   (b) To calculate something, click in a cell and start the calculation with `=`. For example, to add 3+4, click in a cell and type `=3+4` and then hit return. To multiply, you must type `*`.
2. Some starting examples: compute the following
   (a) To add 3 + 4, enter `=3+4`
   (b) To subtract 100-76, enter `=100-76`
   (c) To multiply 4 times 18, enter `=4*18`
   (d) To divide 0.05 by 12, enter `=0.05/12`
   (e) To calculate , enter `=5^25`
3. Use a spreadsheet to compute an 18% tip on a $35.75 bill.
   (a) What is 18% as a decimal? 0.18
   (b) What should we enter into the spreadsheet? =35.75*0.18
4. Suppose we wanted to be able to make a tip calculator, where you could enter the bill, and enter a tip percent, and have it automatically compute the additional tip and the total. We will use *cell references*.
   (a) In cell `A1`, type `Bill Amount`
   (b) In cell `B1`, type `Tip Total`
   (c) In cell `C1`, type `Bill Total`
   (d) In cell `A2`, type `35.75`
   (e) In cell `B2`, type `=0.18*A2`, (or type `=0.18*` and then click on cell `A2`)
   (f) In cell `C2`, type `=A2 + B2` (or click on the corresponding cells)



What happens if you change the bill amount? the tip + total update

What would you need to change if you wanted to give a 20% tip? change 0.18 to 0.2 in (e)

5. We can use *Fill Down* to quickly recalculate changes in values.
   (a) Change the value in cell `A2` to 10.
   (b) In cell `A3` enter 20.
   (c) Select both cells and drag down until you get to 110.
   (d) Drag down the values in cells `B2` and `C2`.
   (e) How much is the tip on a \$110 meal? \$19.80
   How much is the final bill? \$129.80

A	B	C
Bill Amount	Tip Total	Bill Total
10	1.8	11.8
20	3.6	23.6
30	5.4	35.4
40	7.2	47.2
50	9	59
60	10.8	70.8
70	12.6	82.6
80	14.4	94.4
90	16.2	106.2
100	18	118
110	19.8	129.8

6. Simple Interest
   (a) **Definition:** Interest is only earned (or paid) on the original amount. (Imagine you take the interest each year and just put it in your wallet.)
   (b) **Example:** You invest \$500 and you earn 6% interest every year for 5 years (only on the original \$500).

   Calculating simple interest with a spreadsheet:

   i. Make a new sheet in your spreadsheet, called `Interest`.
   ii. In `A1` type `Simple Interest`
   iii. In `A2` `Year`. Type in 1 and 2 and fill down to get to year 5.
   iv. In `B2` type `principal` (principal = starting amount of money).
   v. In `C2` type `interest`
   vi. In `C1` type `0.06` (this is where we are strong our interest)
   vii. Type `500` into `B3`
   viii. Type `=$B$3*$C$1` into `C3`. The `$` fix the row and column references.
   ix. Fill down `C3` until year 5
   x. In `A8` type `total`
   xi. In `C8` type `=sum(C3:C7)` (or type `=sum(` and then click on cell `C3` and drag down to `C7`)
   xii. In `A9` type `grand total` and then in `B9` type `=B3+C8`

   (c) How much interest was earned each year? \$30
   (d) How much interest was earned in total? \$150
   (e) How much money did you have at the end of 5 years? \$650
   (f) What happens if you change the interest rate? What if you change the principal? Experiment. (Then change back to principal = \$500 and interest = 6%)

simple interest		0.06
year	principal	interest
1	500	30
2		30
3		30
4		30
5		30
total		150
grand total	650	

simple interest		0.025
year	principal	interest
1	1500	37.5
2		37.5
3		37.5
4		37.5
5		37.5
total		187.5
grand total	1687.5	

7. Compound Interest

(a) **Definition:** Interest is earned at a certain rate and then reinvested with the principal

(b) **Example:** You invest \$500 and you earn 6% interest, compounded every year for 5 years.

Calculating compound interest with a spreadsheet:

i. Copy the simple interest calculation starting in column `E1`. We will modify to compute compound interest:

ii. In `E1` type `Compound Interest`

iii. Type `=$F$3*$G$1` into `C3`. The `$` fix the row and column references.

iv. Type `=F3+G3` into `F4`. What are we doing? _____

v. Type `=F4*$G$1` into `G4`

vi. Click on both cells `F4` and `G4` and fill them both down simultaneously.

vii. In `F8` type `total`

viii. In `G8` type `=sum(G3:G7)` (or click and drag)

ix. In `E9` type `grand total` and then in `F9` type `=F3+G8`

(c) How much interest was earned in total? 169.11

(d) How much money did you have at the end of 5 years? 669.11

(e) Use a spreadsheet to calculate how much more interest was earned through compound interest vs simple interest. \$19.11

=H9 - B9

compound interest		\$0.06
year	principal	interest
1	\$500.00	\$30.00
2	\$530.00	\$31.80
3	\$561.80	\$33.71
4	\$595.51	\$35.73
5	\$631.24	\$37.87
total		\$169.11
grand total	\$669.11	