Mission Possible

You're sitting in math class, minding your own business, when in walks a Bill Gates kind of guy - the real success story of your school. He's made it big, and now he has a job offer for you.

He doesn't give too many details, mumbles something about the possibility of danger. He's going to need you for 30 days, and you'll have to miss school (yes I know this will make you very, very sad). And you've got to make sure your passport's current. (Get real, Bill, this ain't Paris). But you do sit up at the next thing he says:

You'll have your choice of two payment options:

- One cent on the first day, two cents on the second day, and double your salary every day thereafter for the thirty days; or
- Exactly $1,000,000. (That's one million dollars!)

A student jumps up out of her seat at that. You've got your gal, right here. I'll take that million. I'm out of here. And off she goes on this dangerous million-dollar mission.

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So how smart was this girl? Did she make the best choice? Let's investigate the first payment option.

(a) Complete a table showing how much this option is worth at the end of each day for the first week's work.

(b) How much did she earn in the first week in total?

(c) Complete a table showing how much each earns each day for the second week's work.

(d) How much did she earn in the first two weeks in total?

(e) Complete a table showing how much she earns each day for the third week's work.

(f) How much did he earn in the first three weeks in total?

(g) Complete a table showing how much she earns each day for the fourth week's work.

(h) How much did she earn in the first four weeks in total?

(i) Finally work out how much she earned on the 29^{th} day and the 30th day.

(j) How much did she earn overall in 30 days?

(k) Did she make the correct choice? Justify your answer.