

THE MILLION \$ MISSION

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. (Won't that just be too awful?) And you've got to make sure your passport is current. But do you ever sit up at the next thing he says.

You'll have your choice of two payment options:

1. One cent on the first day, two cents on the second day, and double your salary every day thereafter for the thirty days;

or

2. Exactly \$1,000,000. *Write this on the board the say:* That's one million dollars! You jump up out of your seat at that and say, "You've got your man, Bill, right here. I'll take that million. I'm out of here." And off you go on this dangerous million-dollar mission.

Break in Story

So how smart was this guy? Did he make the best choice? Sounds like it at first, but before we decide for sure, let's investigate the first payment option.

Pass out the table papers and work as a class to complete the first week's work. This what it should look like.

Pay with First Option		
Day No.	Pay for that Day	Total Pay (In Dollars)
1	.01	.01
2	.02	.03
3	.04	.07
4	.08	.15
5	.16	.31
6	.32	.63
7	.64	1.27

So you've worked a whole week and only made \$1.27. That's pretty awful, all right. There's no way to make a million in a month at this rate. Right? Let's check out the second week. Have the students continue to work on their tables. When they have reached day 14, have them write their total on the board.

The second table shows what the students should come up with.

Pay with First Option - Week 2		
Day No.	Pay for that Day	Total Pay (In Dollars)
8	1.28	2.55
9	2.56	5.11
10	5.12	10.23
11	10.24	20.47
12	20.48	40.95
13	40.96	81.91
14	81.92	163.83

Well, he would make a little more the second week. At least he's over \$100. But there's still a big difference between \$163.83 and \$1,000,000. Let's try the third week?

Pay with First Option - Week 3		
Day No.	Pay for that Day	Total Pay (In Dollars)
15	163.84	327.67
16	327.68	655.35
17	655.36	1310.71
18	1 310.72	2 621.43
19	2 621.44	5 242.87
20	5 242.88	10 485.75
21	10 485.76	20 971.51

We're getting into some serious money here now, over \$20,000, but still nowhere even close to a million. And there's only 10 days left. So it looks like the million dollars is the best deal. Of course, we suspected that all along. What happens during the fourth week?

Pay with First Option - Week 4		
Day No.	Pay for that Day	Total Pay (In Dollars)
22	20 971.51	41 943.03
23	41 943.04	83 886.07
24	83 886.08	167 772.15
25	167 772.16	335 544.31
26	335 544.32	671 088.63
27	671 088.64	1 342 177.27
28	1 342 177.28	2 684 354.55

Hold it! Look what has happened. What's going on here? We went from \$21 000 to over a million in 6 days. This can't be right. Let me check the calculations. No, I can't find any mistakes. This is amazing. Look how fast this pay is growing. Let's keep going. I can't wait to see what the total will be.

Pay with First Option - Final Week		
Day No.	Pay for that Day	Total Pay (In Dollars)
29	2 684 354.56	5 368 709.11
30	5 368 709.12	10 737 418.23

In 30 days, the first payment option increases from 1 penny to over 10 million dollars. That is absolutely amazing. Don't you wish you had taken this job?

(Student Tables Attached)

<https://wa-appliedmath.org/>

Name(s): _____ Date: _____

Payment Option One Calculation

Week	Day of Month	Day's Payment (\$)	Total Pay (\$)
1	1	0.01	0.01
	2	0.02	0.03
	3		
	4		
	5		
	6		
	7		
2	8		
	9		
	10		
	11		
	12		
	13		
	14		
3	15		
	16		
	17		
	18		
	19		
	20		
	21		
4	22		
	23		
	24		
	25		
	26		
	27		
	28		
5	29		
	30		