Gift you $500 in 4 years.

Find the PV assume. 4% discount.

$$PV = \frac{500}{1.04^4} \approx 422.40$$

GE. 5% for 10 years
semi-annually

$10,000 → GE

twice a year for 10 years. 250 ← GE

$10,000 ← GE

assume discount rate = 2%

$$\frac{10{,}000}{(1.02)^{10}} + \left[\frac{250}{(1.01)^{20}} + \frac{250}{(1.01)^{19}} + \frac{250}{(1.01)^{18}} \cdots \frac{250}{1.01}\right]$$

$$= 8203.48 + \sum_{K=1}^{20} \frac{250}{(1.01)^K} = 8203.48 + \frac{250}{1.01}\frac{(1-r^{20})}{(1-r)}$$

$$= 8203.48 + \frac{\left(1-\left(\frac{1}{1.01}\right)^{20}\right)}{1-\frac{1}{1.01}}\left(\frac{250}{1.01}\right)$$

$$\approx 8203.48 + \frac{(0.180458)}{0.009901}\left(\frac{250}{1.01}\right)$$

$$\approx 12{,}714.85$$

A college graduate is offered a job with two different companies. Firm A offers a starting salary of $75,000 with $5000 pay raises. Firm B offers $70,000 with 6% pay raises.

Which job pays more in the tenth year of working?

Which job pays more over the course of the first ten years of working?

Which job would you take. Explain your reasoning?

$a_n = a_1 + d(n-1) = 75{,}000 + 5000(n-1)$

$b_n = b_1 r^{n-1} = 70{,}000(1.06)^{n-1}$

$a_{10} = 120{,}000$

$b_{10} = 118{,}263$

$b_{11} = 125{,}359$

$b_{12} = 132{,}880$

$\sum_{n=1}^{10} a_n = \left(\frac{a_1 + a_{10}}{2}\right) 10$

$= 5(195{,}000)$

$= 975{,}000$

$\sum_{n=1}^{10} b_n = 70000\left(\frac{1-1.06}{1-1.06}\right)^{10}$

$= 70{,}000\left(\frac{-0.7908}{-0.06}\right)$

$\approx 922{,}656.65$

$\sum_{n=1}^{20} a_n = 2.45\,MM$

$\sum b_n \approx 2.574\,MM$

A ball is thrown into the ground. It bounces to a height of 60 feet. After that it bounces to a height that is 70% of the height on the previous bounce.

How high does the ball bounce on the 20th bounce?

How far does the ball travel up and down through the first twenty bounces (just before it hits the ground for the 21st bounce)?

If the ball keeps bouncing forever how far up and down will it travel?

$60 \quad 60(0.70) \quad 60(0.7)^2 \quad 60(0.7)^3 \quad 60(0.7)^4$

$g_n = 60(0.70)^{n-1}$

$g_{20} = 0.0478 \text{ ft}.$

$$\sum_{n=1}^{20} g_n = 60\left(\frac{1-0.7^{20}}{1-0.7}\right)$$

$$= 199.84$$

$dist = 400.$

$$\sum_{n=1}^{\infty} g_n = \frac{60}{0.3} = 200$$

$dist = 400.$

Melissa's parents want to start saving for her college costs today they estimate that they will need to have saved $400,000 by the time she starts college. They plan to put away a certain amount each month starting one month after she is born for 216 months (18 years). The last month will be the day before she starts college (so no interest will be earned on it). They figure that they can earn 4.8% annual return compounded monthly (so really .4% per month). How much money should they put away each month so that they will have $400,000 18 years from now?