Problem 1 (Chapter 12) https://wmvolckmann.github.io

Productivity is defined as the amount of goods and services a worker can produce per hour.

(a) Complete the table below by calculating physical capital per worker as well as labor productivity.

Year	Physical Capital *(Looms)*	Labor Force *(Workers)*	Physical Capital per Worker *(Looms)*	Labor Hours *(Hours)*	Output *(Garments)*	Labor Productivity *(Garments per hour of labor)*
2026	40	20		1,000	6,000	
2027	120	40		1,400	12,600	

(b) Based on your calculations, an (*increase or decrease*) in physical capital per worker from 2026 to 2027 is associated with an (*increase or decrease*) in labor productivity from 2026 to 2027.

(c) Which of the following policies would lead to greater productivity in the weaving industry?

- Sharply increasing the interest rate on student loans to people pursuing advanced degrees in weaving
- Encouraging saving by allowing workers to set aside a portion of their earnings in tax-free retirement accounts
- Imposing restrictions on foreign ownership of domestic capital
- Imposing a tax on looms

Problem 2 (Chapter 13) https://wmvolckmann.github.io

Suppose GDP in this closed-economy country is \$900 million. Enter the amount for consumption. (Recall: $GDP = C + I + G + XM$. A closed economy means $XM = 0$.)

National Income Account	Value (Millions of dollars)
Government Purchases (G)	250
Taxes minus Transfer Payments (T)	325
Consumption (C)	
Investment (I)	275

- **Private saving** is defined as $Y - T - C$.
- **Public saving** is defined as $T - G$.
- **National saving**, denoted S, is defined as $S = Y - C - G$. Notice that national saving is private saving plus public saving:

$$(Y - T - C) + (T - G) = Y - C - G = S.$$

Find all three types of saving. Is the government running a budget surplus or deficit?

OMG YOU WON TEH LOTTERY!!!!!11 Yeah, um, you can receive the money either

- as a lump sum – you receive $2,850 today, or
- you get $1,000 today, $1,000 a year from today, and $1,000 two years from today.

(a) The interest rate is 5% per year. Assuming you want the option that gives you the most purchasing power, would you rather take the lump sum or the payments over time?

(b) What about if the interest rate is 8% per year?

Future Value, Present Value, and Discounting

Future Value

- Suppose you have the choice of receiving \$100 today or \$105 tomorrow. Which would give you more purchasing power? *It depends on the interest rate.*

- Suppose the interest rate is 2%. Then you could accept \$100 today, invest it for a year at 2%, and have \$102 one year from now—this is the **future value** of the \$100. But you would have been better off just accepting the second option of \$105 one year from now.

- Suppose the interest rate is 10%. Then you could accept \$100 today, invest it for a year at 10%, and have \$110 one year from now—again, this is the future value. This is more than the \$105 you'd have received if you'd chosen the second option.

Present Value

Instead of figuring out what \$100 is worth one year from now, we can figure out what amount of money today is equivalent to \$100 one year from now. In other words, we want to solve

$$\$x \times (1+r) = \$100 \quad \Longrightarrow \quad \$x = \frac{\$100}{1+r},$$

where r is the interest rate. This gives the **present value** of \$100 one year from now. We can apply the same logic to any number of years, for instance \$100 two years from now is today worth

$$\$x \times (1+r)^2 = \$100 \quad \Longrightarrow \quad \$x = \frac{\$100}{(1+r)^2}$$