Naphat Vanapongtipakon

A device requires A and B components for a device. Component A costs 7 euros and component B costs 12 euros each. The total cost for producing a batch for these components is 19 800 euros. The total components are 2400. How many of each component type (A and B) are there?

let x = number of components A

y = number of components B

$7x + 12y = 19,800$ — ①

$x + y = 2400$ — ②

② × 7 : $7x + 7y = 16800$

① − ② : $5y = 3000$

$y = 600$ #

② : $x + 600 = 2400$

$x = 1800$ #

∴ components A have 1800 pieces components B have 600 pieces #

Internet speeds can be considered to have grown in an exponential manner. Today in Finland the standard speeds are around 100 Megabits/s, and let's say they used to be 20 Megabits/s in 2014.
a) What is the exponential growth rate of these speeds?
b) If we consider this pace of development to continue, what would be a standard connection in 2030?
c) Today the fastest (consumer) connections are around 1 000 mbit/s a second, when would these be double the amount if also these developed at the same pace?

a) $PV = 20$ Mbps

$FV = 100$ Mbps

$t = 11$ years

$FV = PV \times (1+r)^t$

$100 = 20 \times (1+r)^{11}$

$\frac{100}{20} = \frac{20 \times (1+r)^{11}}{20}$

$5 = (1+r)^{11}$

$1+r = 5^{\frac{1}{11}}$

$r = 0.1576$ or 15.76%

b) $t = 2030 - 2014 = 16$ years

$FV = 20 \times (1 + 0.1576)^{16}$

$FV = 20 \times (1.1576)^{16}$

$FV \approx 20 \times 10.40 \approx 208$ Mbps

∴ In 2030 standard connection ≈ 208 Mbps

c) $2000 = 1000 \times (1.1576)^t$

$\frac{2000}{1000} = \frac{1000 \times (1.1576)^t}{1000}$

$2 = (1.1576)^t$

$\log 2 = t \log 1.1576$

$t = \frac{\log 2}{\log 1.1576} = 4.74$ years

∴ the fastest connections will be double in 4.74 years

Date

My Question

(04) Let's say the hard drive Capacity of a laptop model has grown From 256 to 1024 GB in 8 years. If Consider a yearly rate and apply the exponential growth Fomula to this, how much is the yearly growth

$$FV = p(1+r)^n$$

FV = Future value / p = Initial value / r = ? annal growth

n = number of period

$FV = p(1+r)^n$

FV = 1024

P = 256

n = 8

r = ?

$$1024 = 256(1+r)^8$$

$$\frac{\cancel{1024}^{4}}{\cancel{256}_{1}} = \frac{\cancel{256}(1+r)^8}{\cancel{256}}$$

$$4 = (1+r)^8$$

note : press 4 then ln

$$1+r = 4^{\frac{1}{8}}$$

$$\ln(4) = 8\ln(1+r)$$

$$\ln(4) = 8\ln(1+r)$$

$$\ln(1+r) = \frac{\ln(4)}{8}$$

Annual growth rate is 18.9%

$$\ln(4) = 1.386$$

$$\ln(1+r) = \frac{1.386}{8}$$

$$= 0.173$$

$$1+r = e^{0.173}$$

* Note: enter 0.173 then e^x

$$1+r = 1.189$$

$$r = 18.9\%$$

My solution for partner

$$FV = PV(1+r)^t$$

$$\frac{FV}{PV} = (1+r)^t$$

$$1+r = \left(\frac{FV}{PV}\right)^t$$

$$r = \left(\frac{FV}{PV}\right)^t - 1$$

$$r = \left(\frac{1024}{256}\right)^{\frac{1}{8}} - 1$$

$$r = 1.1892 - 1 = 0.1892 \text{ or } 18.92\%$$

My review

I think it is the same formular as I use but it is different in solution as I solve for the solution to get r first then I put number in it. And the final answer still same so I think it is correct.