Section 7.7 Inflation, Appreciation, and Depreciation

Inflation is a measure of how much the cost of goods increases by. It is normally given as a percentage per year. Appreciation is the increase in value of an item over time.

Depreciation describes how much the value of something decreases over time. Assets such as computers and cars lose value as time passes. This is due to wear and tear, technology becoming old, etc. We say that they depreciate over time.

You can use the TVM app or the Compound Interest formula with the following adjustments: Depreciation... enter the rate as a negative. This is since the item is losing value over time. And your *k* value is 1. So that means your P/Y and C/Y would be 1. This is the same if you are doing the computations by hand as well.

So $FV = PV \times \left(1 + \frac{r}{100k}\right)^{kn}$ becomes $FV = PV \times \left(1 \pm \frac{r}{100}\right)^{n}$ **(negative for depreciation)**

***Example*:** An industrial dishwasher was purchased for £2,400 and depreciated by 15% each year. Find its value after six years. Then tell by how much the dishwasher depreciated.

N: 6
I%: -15 (negative since it is depreciating)
PV: -2,400
PMT: not needed (enter as 0)
FV: what we're solving for... leave blank or enter as 0
P/Y: 1
C/Y: 1 (annually)
PMT: end

Value after 6 years: £905.16

By hand...

$$FV = 2400\left(1 - \frac{15}{100}\right)^{6}$$

Depreciated by: 2,400 – 905.16 = £1,494.84

***Example*:** A vending machine bought for $15,000 is sold 3 years later for 63.6% of its initial value. Calculate its annual rate of depreciation.

First... find the Future Value... (15,000)(0.636) = $9,540

N: 3
I%: what we're solving for... leave blank or enter as 0
PV: -15,000
PMT: not needed (enter as 0)
FV: 9,540
P/Y: 1
C/Y: 1 (annually)
PMT: end

***r* = 14.0%**

By hand...

$$9540 = 15000\left(1 - \frac{x}{100}\right)^{3}$$

Solve by graphing

***Example*:** A collectible is bought for $100 and its value 3 years later has increased 60%. Calculate its annual rate of appreciation.

First... find the Future Value... (100)(160%) = (100)(1.60) = $160

N: 3
I%: what we're solving for... leave blank or enter as 0
PV: -100
PMT: not needed (enter as 0)
FV: 160
P/Y: 1
C/Y: 1 (annually)
PMT: end

r = 17.0%

By hand...

$$160 = 100\left(1 + \frac{x}{100}\right)^3$$

Solve by graphing

***Example*:** If the inflation rate in Canada this year is 2.35% calculate the likely cost of a 750 CAD laptop computer... a) Four years later. b) One year ago.

N: 4
I%: 2.35
PV: -750
PMT: not needed (enter as 0)
FV: what we're solving for... leave blank or enter as 0
P/Y: 1
C/Y: 1 (annually)
PMT: end

a) Value after 4 years:
823.02 CAD

By hand...

$$FV = 750\left(1 + \frac{2.35}{100}\right)^4$$

a) Value 1 year ago:
change the N to be –1
(since it's in the past)
732.78 CAD

***Example*:** Jose´ runs a printing business in Chile. He decides to buy a new printing press at a cost of 4500 pesos. The value of the press depreciates at a rate of 10% each year. How long will it take before the press is worth half the amount that he paid for it?

N: what we're solving for... leave blank or enter as 0
I%: -10
PV: -4500
PMT: not needed (enter as 0)
FV: 2250 (Half the value)
P/Y: 1
C/Y: 1 (annually)
PMT: end

Time: 6.6 years

By hand...

$$2250 = 4500\left(1 - \frac{10}{100}\right)^x$$

Solve by graphing