5.6 Compound Interest

Ex1 Adriane purchased a new car for $18,000. the loan had a 5% interest rate for 5 years. Find the total amount she will pay after the 5 years?

This is simple interest so, $I = Prt$

5% = 0.05

$I = 18,000 (0.05)(5)$

$= 4,500$

Asking for total amount

Adriane will pay $18,000 + 4,500$ which is $22,500 for the car.

You try... What is the simple interest on a loan for $15,700 at 5.5% for 3 years?

Just asking for interest

$I = 15,700 (0.055)(3)$

$= 2,590.50$

$2,590.50 in interest for 3 years

Ex2 Nick invested $5000 at 6%, compounded quarterly. How much will Nick have after 10 years?

Compounded so $A = P\left(1 + \frac{r}{n}\right)^{nt}$

$A = 5000\left(1 + \frac{0.06}{4}\right)^{4(10)}$

$\approx 9,070.09$

After 10 years, Nick will have $9070.09

You try... Marcy invested $1250 at 3.5%, compounded monthly. How much will Marcy have after 8 years?

$A = 1250\left(1 + \frac{0.035}{12}\right)^{12 \cdot 8}$

≈ 1541.63

After 8 years, Marcy will have $1541.63

Ex 3 Jon invested 2000 at 5.5% compounded continuously. How much will Jon have in his account after 20 years?

Compounded continuously so, $A = Pe^{rt}$

$$A = 2000e^{(0.055)(20)}$$

$$\approx 6008.33$$

After 20 years, Jon will have $6008.33

You try... How much money will Sally need to invest initially in order to have $100,000 after 18 years if the money is compounded continuously at 8%?

$$\frac{100000}{e^{(0.08)(18)}} = \frac{Pe^{(0.08)(18)}}{e^{(0.08)(18)}}$$

$$P \approx 23,692.78$$

Sally will need to invest about $23,692.78 to have $100,000.