1. Present value - How much should she invest now?

$$P = A(1+i)^{-n}$$
$$= 10\,000(1.004)^{-36}$$
$$= 8661.36$$

$i = \frac{0.05}{12}$
$= 0.004$

$n = 3 \times 12$
$= 36$

She needs to invest $8661.36 now

2. Future value - How much will he have later

$$A = P(1+i)^{n}$$
$$= 500(1.005)^{54}$$
$$= 654.54$$

$i = \frac{0.06}{12}$
$= 0.005$

$n = 4.5 \times 12$
$= 54$

She will have $654.54

3. Present value - How much should they invest now

$P = A(1+i)^{-n}$

$= 20000\ (1.025)^{-14}$

$= 14\,154.54$

They need to invest $14 154.54.

$i = \frac{0.05}{2}$

$= 0.025$

years = 20 - 13 = 7

$n = 7 \times 2$

$= 14$

4. Future value → How much can they spend on books in 3 years?

$A = P(1+i)^{n}$

$= 50\,000\,(1.019375)^{12}$

$= 62\,947.39$

$I = A - P$

$= 62947.39 - 50\,000$

$= 12947.39$

∴ They have $12 947.39 to spend

$i = \frac{0.075}{4}$

$= 0.019375$

$n = 3 \times 4$

$= 12$

5. Future Value → How much will she owe in 2 weeks

$A = P(1+i)^n$

$= 1550(1.000466)^{14}$

$\doteq 1560.14$

She will owe $1560.14 after 2 weeks.

$i = \frac{0.17}{365}$

$\doteq 0.000466$

$n \Rightarrow$ 2 weeks

$= 14$ times since interest applied daily

6. Future Value → How much will she owe in a year

$A_{Bank} = P(1+i)^n$

$= 5000(1.004167)^{12}$

$= 5255.83$

$i = \frac{0.05}{12}$

$\doteq 0.004167$

$n = 12$

$A_{car\ dealership} = P(1+i)^n$

$= 5000(1.02625)^2$

$= 5265.95$

$i = \frac{0.0525}{2}$

$= 0.02625$

$n = 2$

The bank offers the better loan in the end you owe less.

7. Present Value → How much did they invest in the beginning

$P = A(1+i)^{-n}$

$P = 10000(1.04375)^{-42}$

$= 1655.57$

They must deposit $1655.57 when she is born.

$i = \frac{0.0875}{2}$

$= 0.04375$

$n = 21 \times 2$

$= 42$

8. Present Value → how much must he have now to end up with $2000 later

$P = A(1+i)^{-n}$

$= 2000(1.0025)^{-24}$

$= 1883.67$

Amount he can spend $= 3000 - 1883.67$

$= 1116.33$

$i = \frac{0.03}{12}$

$= 0.0025$

$n = 2 \times 12$

$= 24$