Annuities

COURSE TEACHING ASSISTANTS

Kamal Ezzo kamal.ezzo@must.edu.eg

Maryam Gebraeil maryam.gebraeil@must.edu.eg

Tasneem Abdelraouf tasneem.abdelraouf@must.edu.eg

Sarah Hamzah sarah.hamza@must.edu.eg

Rules

Given		Keywords
A	the annuity: the same amount paid each time	*deposits, pays, invests*
n	number of payments = term ÷ period	*every 2 months for 1 year:* $n = 12 \div 2$
r	annual simple interest rate	*% annually*
F	time from the **first** payment to the end	*months, or days*
L	time from the **last** payment to the end	

Step	Rule	Keywords
Total	$\sum A = (A \times n) + A \times r \times \frac{n}{2} \times \frac{F+L}{12}$	*accumulated amount, sum, total*
	use 360 instead of 12 when F and L are in days	
Interest	$\sum A - (A \times n)$	*interest*
Balance	$\sum A_{\text{deposits}} - \sum A_{\text{withdrawals}}$	*withdraws, balance, amount due*
Due	payment at the **beginning**: $F =$ term, $L =$ one period	*beginning, rent*
Ordinary	payment at the **end**: $F =$ term − one period, $L = 0$	*end, salary*
	no type in the question means ordinary	

Note. To find A or r: put the numbers in the total rule and solve for the unknown. Round answers to 2 decimal places.

Q1

A person deposits $500 at the end of every 3 months for 2 years at simple interest 10% annually. Find the accumulated amount at the end of the term.

Q2

$800 is deposited at the beginning of every month for 10 months at 12% simple interest. Find the total accumulated.

Q3

A person deposits a fixed sum at the end of every 6 months for 3 years at 8% simple interest. At the end of the term the accumulated amount is $6,480. Find each payment.

Q4

$250 is deposited at the beginning of every 2 months for 1 year. The accumulated sum is $1,605. Find the interest rate.

Q5

$150 is deposited every 15 days for 90 days at 12% simple interest. Find the accumulated amount.

Q6

A company deposits $5,000 at the beginning and middle of each month starting in January (6 months). It withdraws $2,000 on the 10th and 20th of each month starting in March (4 months). Interest is 6%. Find the balance at the end of June.

Q7

$300 is deposited at the beginning of every 2 months for 1 year. The accumulated sum was $1,931.25. Find the interest rate.

Q8

A sum is deposited every 15 days for 120 days at 9% simple interest. At the end of 120 days the accumulated amount is $4,090. How much is deposited each time?

Q9

A firm deposits 5,000 L.E. at the beginning of each quarter starting 1 January 2020. It withdraws 2,000 L.E. at the end of each quarter starting 31 March 2020. Find the balance at the end of December 2020 at 6% simple interest.

Q10

A semi-annual annuity of 1,200 L.E. is paid for 3 years at 8% simple interest. Find the accumulated amount at the end of 3.5 years if the annuity is:

a) ordinary

b) due

Q11 Extra

A person deposited 300 L.E. at the beginning of each month for the first 6 months of the year, then 600 L.E. at the end of every 2 months for the rest of the year, at a simple interest rate of 10% annually. Find the amount at the end of the year.

Q12 Extra

450 L.E. is deposited at the beginning of every 20 days for 120 days at a simple interest rate of 15% annually. Find the interest.