

# APPLIED MATHEMATICS

## *Business Mathematics*

1. The amount of money deposited in a bank account grows over time. If the amount of money in the account is \$1000 at the end of 1 year, and the amount of money in the account is \$1100 at the end of 2 years, find the interest rate.

Answer:

### SOLUTION:

Let  $P$  be the principal amount,  $r$  be the interest rate, and  $t$  be the time in years.

At the end of 1 year,

$$A = P(1 + rt) \implies 1100 = P(1 + r \cdot 1) \implies 1100 = P(1 + r) \implies P = \frac{1100}{1 + r}$$

At the end of 2 years,

$$A = P(1 + rt) \implies 1210 = P(1 + r \cdot 2) \implies 1210 = P(1 + 2r) \implies P = \frac{1210}{1 + 2r}$$

Since the principal amount is the same,

$$\frac{1100}{1 + r} = \frac{1210}{1 + 2r} \implies 1100(1 + 2r) = 1210(1 + r) \implies 1100 + 2200r = 1210 + 1210r \implies 2200r - 1210r = 1210 - 1100 \implies 990r = 110 \implies r = \frac{110}{990} = \frac{1}{9} \approx 0.1111$$

Therefore, the interest rate is  $\frac{1}{9}$  or 11.11%.