

Word Problems

- **Read Problem Carefully**
- Determine the appropriate formula
- Write down what you are given
- Solve

For a compact car the cost of maintenance and repairs increased by \$85 each year. If in the first year the amount was \$120, how much was the maintenance at the end of year five?

120, 205, 290, 375, 460

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$$t_n = a + (n - 1)d$$

$$t_5 = 120 + (5 - 1)(85)$$

$$t_5 = 120 + 4(85)$$

$$t_5 = 120 + 340$$

$$t_5 = \$460$$

Given:

$$a = \$120$$

$$d = \$85$$

70 000, ———, ———, 105 000

A house worth \$70 000 sold for \$105 000 3 years later.
Find the *annual rate of increase* if the value of the house increased geometrically.

• **Read Problem Carefully**

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$$t_n = ar^{n-1}$$

Given:

$a = 70\,000$

$n = 4$

$t_4 = 105\,000$

$r = ?$

$$\frac{105\,000}{70\,000} = \frac{70\,000 r^{4-1}}{70\,000}$$

$$(1.5)^3 = (r^3)^3$$

$$1.1447 = r$$

$$AROI : 100(1.1447 - 1) = \boxed{14.47\%}$$

Ex:

r	AROI	r	AROD
1.5	50%	0.9	10%
1.25	25%	0.85	15%
1.36	36%	0.45	55%
2.10	110%		

As it aged, a maple tree produced sap according to the pattern shown in the table below.

Year	2001	2002	2003	2004
Sap (Litres)	$t_1 = \underline{60.000}$ $a = 60$	$t_2 = 57.000$	$t_3 = 54.150$	$t_4 = 51.4425$

a) Does the data follow an arithmetic or geometric pattern? $r = 0.95$

b) Write down a formula for t_n ? $t_n = ar^{n-1}$
 $t_n = (60)(0.95)^{n-1}$

c) Assuming the pattern continues, how long will it take for the sap production to be approximately 17.5L? $t_n = 17.5$

$$t_n = ar^{n-1}$$

$$\frac{17.5}{60} = \frac{(60)(0.95)^{n-1}}{60}$$

$$0.2917 = (0.95)^{n-1}$$

$$(0.95)^{24} = (0.95)^{n-1}$$

$$24 = n-1$$

$$25 = n$$

$$\frac{\log(0.2917)}{\log(0.95)} = 24.02$$

In year 25 there will be approx. 17.5 L of sap

Homework