D: Using Exponents to Solve Problems Continued

- When a Formula is not Provided

3. A colony of bacteria doubles every hour. If there are 10 bacteria now, how many will be present after:

a) 2h

Exponential Expression

$\text{coeff} \times \text{base}^{\text{exponent}}$

coeff - original amount
base - doubles triples etc.
exponent - time passed

coeff - 10
base - doubles ∴ 2
exponent - 2 b/c 2h

10×2^2 ✓

$= 10 \times 4$ ✓

$= 40$ bacteria ✓

b) 12 h.

coeff - 10
base - 2 (doubles)
exp - 12 b/c 12 hrs.

10×2^{12} ✓

$= 10 \times 4096$ ✓

$= 40\,960$ bacteria

c) "x" hours.

coeff - 10
base - 2 doubles
exp - x b/c x hours

$= 10 \times 2^x$ ✓

✗ as far as you can go.

4] A combination lock has four disks that rotate holding numbers 0 to 9. A combination consists of four numbers & the numbers can be repeated. How many combinations are possible? Express as a power, then evaluate:

Disk 1 × Disk 2 × Disk 3 × Disk 4

10 × 10 × 10 × 10

$= 10^4$ ✓

= 10 000 ✓

0 to 9 is 10 numbers, so each disk could be any of the 10.

Page. 118 # 5, 6, 7, 9, 10