

**BACCALAURÉAT GENERAL**  
**EPREUVE SPECIFIQUE DES SECTIONS EUROPENNES**  
**MATHEMATIQUES – ANGLAIS**

**Corrigé du sujet 3**

**I.**

**II.**

1.  $D(36) = \{1; 2; 3; 4; 6; 9; 12; 18; 36\}$  Factor tree to find the divisors.

$1+2+3+4+6+9+12+18 = 55$  No 36 is not a perfect number

2.  **$D(28) = \{1; 2; 4; 7; 14; 28\}$**

$1 + 2 + 4 + 7 + 14 = 28$  Yes 28 is a perfect number.

3. A prime can be divided by 1 and itself. It can't be a perfect number.

4.  $1^2 + 9^2 = 82$  ;  $8^2 + 2^2 = 68$  ;  $6^2 + 8^2 = 100$  ;  $1^2 + 0^2 + 0^2 = 1$

**19 is happy**

5.  $2^2 = 4$  ;  $4^2 = 16$  ;  $1^2 + 6^2 = 37$  ;  $3^2 + 7^2 = 58$  ;  $5^2 + 8^2 = 89$  ;  $8^2 + 9^2 = 145$

$1^2 + 4^2 + 5^2 = 42$  ;  $4^2 + 2^2 = 20$  ;  $2^2 + 0^2 = 4$  .....

$4^2 = 16$  .....

**The pattern is : 4 ; 16 ; 37 ; 58 ; 89 ; 145 ; 42 ; 20 ; 4....**

6. 28 is perfect ( thanks to 1b)

$2^2 + 8^2 = 68$  ;  $6^2 + 8^2 = 100$  and  $1^2 + 0^2 + 0^2 = 1$

**28 is happy and perfect.**

**BONUS :** Explain how to find a prime number....Palindromic numbers. Triangular numbers