Example 5 (p30) - Divisibility rule for 3.

Prove the divisibility rule for 3 is valid for two digit numbers.

Rule: Add the digits, if the sum is divisible by 3, then the original number is divisible by 3.

$9 = 9(1)$

$27 = 2(10) + 7(1)$

$729 = 7(100) + 2(10) + 9(1)$

$ab = a(10) + b(1)$

a two digit number

Consider a two-digit number, ab.

$ab = 10a + b$

$ab = 9a + a + b$

$ab = 9a + (a+b)$

divisible by 3

the sum has to be divisible by 3 in order for ab to be divisible by 3.

We have just proven the divisibility rule for 3 for a 2 digit number

p31 (CYU)

1. let x be an integer
   let S be the sum

median

$S = (x-\cancel{3}) + (x-\cancel{2}) + (x-\cancel{1}) + x + (x+\cancel{1}) + (x+\cancel{2}) + (x+\cancel{3})$

$S = 7x$ The sum of 7 consecutive integers is seven times the median

median

4. let the first even integer be $2x$
   second even integer be $2y$
   let S be the sum

$S = 2x + 2y$

$S = 2(x+y)$

divisible by 2 ∴ it is an even #.

5. let $2x$ be the even integer
   $2y+1$ be the odd integer.
   let P be the product

$P = 2x(2y+1)$ ← divisible by 2 ∴ even

or $P = 4xy + 2x$

both terms are divisible by 2 so the product is

or $P = 2(2xy + x)$

↖ best to show the two factored out (the product (P) is divisible by 2, so it must be even)

TO DO:

① Finish p31 | 4-10

② p32 | 11, 13-16, 19+20