# Algoritmo de la división

$a = 58 \,,\ n = 7$

$q = 8 < 59/7 < 9$

$$
\begin{aligned}
r &= a - (q)\, n \\
&= 59 - (3)\, n \\
&= 59 - 56 \\
&= 3
\end{aligned}
$$

$59 = (3)7 + 3$

$a = 84 \,,\ n = 12$

$q = 7 < 84/12 < 8$

$$
\begin{aligned}
r &= a - (q)\, n \\
&= 84 - (7)\, 12 \\
&= 84 - 84 \\
&= 0
\end{aligned}
$$

$8 = (7)\, 12$

$a = -96 \,,\ n = 12$

$q = -8 < -96/12 < -7$

$$
\begin{aligned}
r &= -96 - (-8)\, 12 \\
&= -96 + 96 \\
&= 0
\end{aligned}
$$

$-96 = (-8)\, 12$

$a = 100 \,,\ n = 9$

$q = 11 < 100/9 < 12$

$$
\begin{aligned}
r &= 100 - (11)\, 9 \\
&= 100 - 99 \\
&= 1
\end{aligned}
$$

$100 = (11)9 + 1$

$a = -4 \,,\ n = 5$

$q = -1 < -4/5 < 0$

$$
\begin{aligned}
r &= -4 - (-1)\, 5 \\
&= -4 + 5 \\
&= 1
\end{aligned}
$$

$-4 = (-1)\, 5 + 1$

# Algoritmo Euclides

93, 27

$93 = (3)27 + 12$

$27 = (2)12 + 3$

$12 = (4)3 + 0$

$mcd = 3$

204, 78

$209 = (2)78 + 53$

$78 = (1)53 + 15$

$53 = (3)15 + 8$

$15 = (1)8 + 7$

$8 = (1)7 + 1$

$7 \quad (1)1 + 0$

$mcd = 1$

138, 61

$138 = (22)61 + 16$

$61 = (3)16 + 13$

$16 = (1)13 + 3$

$13 = (4)3 + 1$

$3 = (3)1 + 0$

$mcd = 1$

231, 49

$231 = (4)49 + 35$

$49 = (1)35 + 14$

$35 = (2)14 + 7$

$14 = (2)7 + 0$

$mcd = 7$

# Coeficiente de Bézout

- $-112, -91$

$-112 = (2)(-91) + 70$
$-91 = (-2)\,70 + 49$
$70 = (1)\,49 + 21$
$49 = (2)\,21 + 7$
$21 = (3)\,7 + 0$

$7 = 49 - (2)\,21$
$= (2)[70 - 49] = (3)\,49 - (2)\,70$
$= (3)[-91 + (2)70] - (2)[-112 + (2)91]$
$= (3)\,-91 + (4)\,-91 + (-2)(-112) + (6)\,70$
$= (7)\,-91 + (-2)\,-112 + 6[-112 + (2)91]$
$= (-5)\,-91 + (4)\,-112$

$7 = (4)\,-112 + (-5)\,-91$

- $-105, 39$ $[mcd(105, 39) = mcd(-105, 39)]$

$105 = (2)\,39 + 27$
$= (1)\,27 + 12$
$= (2)\,12 + 3$
$= (4)\,3 + 0$

$3 = 27 - (2)\,12$
$= 27 - (2)[39 - 27] = (3)\,27 - (2)\,39$
$= (3)[-105 + (-6)\,39 - (2)\,39$
$= (-3)\,-105 + (-6)\,39 - (2)\,39$
$= (-3)\,-105 + (-3)\,39$

# Residuo mínimo

$\boxed{\bullet\ r \bmod 10}$

- $50 \bmod 10$

  $5 \leq 50/10 < 6$

  $r = 50 - (5)10$

  $r = 0$

- $6 \bmod 10$

  $0 < 6/10 < 1$

  $r = 6 - (0)10$

  $r = 6$

- $17 \bmod 10$

  $1 < 17/10 < 2$

  $r = 17 - (1)10$

  $r = 7$

- $-1 \bmod 10$

  $-1 < -1/10 < 0$

  $r = -1 - (-1)10$

- $-38 \bmod 10$

  $-4 < -38/10 < -3$

  $r = -33 - (-4)10$

  $r = 2$

$\boxed{\bullet\ r \bmod 3}$

- $17 \bmod 3$

  $5 < 17/3 < 6$

  $r = 17 - (5)3$

  $r = 2$

- $9 \bmod 3$

  $3 \leq 9/3 < 4$

  $r = 9 - (3)(3)$

  $r = 0$

- $-2 \bmod 3$

  $-1 \leq -2/3 < 0$

  $r = -2 - (-1)3$

  $r = 1$

- $3 \bmod 3$

  $1 \leq 3/3 < 2$

  $r = 3 - (1)3$

  $r = 0$

- $-10 \bmod 3$

  $-4 < -10/3 < -3$

  $r = -10 - (-4)3$

  $r = 2$

¿Qué día de la semana va a ser dentro de 1000 días?

$\Rightarrow$ Jueves

(jueves)

7 días a la semana $\{$ $1004 = 1000 + 4 =$

$$1004 \bmod 7 \equiv (700 + 280 + 24) \% \ 7$$

$$\equiv 24 \bmod 7$$

$r = 3$ (3er día de la semana)

Sería Miércoles

# Aritmética modular

min r mod 6

- $7+3 \mod (6)$
  $10 \mod 6$
  $r = 4$

- $7-3 \mod 6$
  $4 \mod 6$
  $r = 4$

- $67+68 \mod 6$
  $(67+68 \equiv (7+8) \mod 6$
  $\equiv 15 \mod 6$

  $r = 3$

- $601 - 6001 \mod 6$
  $\equiv 1-1 \mod 6$
  $\equiv 0 \mod 6$

  $r = 0$

- $-3-19 \mod 6$
  $-22 \mod 6$
  $r = 2$

# Aritmética modular

min. r mod 10

- $6+4 \mod 10$
  $10 \mod 10$
  $r=0$

- $21-17 \mod 10$
  $\equiv 9+3 \mod 10$
  $\equiv 12 \mod 10$
  $r=2$

- $14-7 \mod 10$
  $7 \mod 10$
  $r=7$

- $101+11+1 \mod 10$
  $\equiv 1+1+1 \mod 10$
  $\equiv 3 \mod 10$

  $r=3$

- $10-11-1 \mod 10$
  $\equiv 0-1-1 \mod 10$
  $\equiv -2 \mod 10$
  $r=8$

- $13-15 \mod 10$
  $\equiv 3-5 \mod 10$
  $\equiv -2 \mod 10$
  $r=8$