

## Arytmetyka modulo

### 1. Obliczyć reszty z dzielenia:

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|--------------------|-------------------|--------------------|
| (a) $5 \bmod 3$    | (i) $100 \bmod 7$ | (q) $-13 \bmod 2$  |
| (b) $7 \bmod 2$    | (j) $43 \bmod 7$  | (r) $-23 \bmod 3$  |
| (c) $2002 \bmod 2$ | (k) $27 \bmod 6$  | (s) $-23 \bmod 5$  |
| (d) $23 \bmod 4$   | (l) $55 \bmod 17$ | (t) $-12 \bmod 11$ |
| (e) $31 \bmod 16$  | (m) $-3 \bmod 5$  | (u) $-26 \bmod 7$  |
| (f) $24 \bmod 3$   | (n) $-2 \bmod 3$  | (v) $-100 \bmod 3$ |
| (g) $31 \bmod 5$   | (o) $-3 \bmod 7$  | (w) $-100 \bmod 2$ |
| (h) $100 \bmod 3$  | (p) $-2 \bmod 2$  | (x) $-49 \bmod 6$  |

### 2. Obliczyć reszty z dzielenia

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|--------------------|--------------------|--------------------|
| (a) $12 \bmod 5$   | (g) $12 \bmod 5$   | (m) $13 \bmod 4$   |
| (b) $-12 \bmod 5$  | (h) $-12 \bmod 5$  | (n) $-13 \bmod 4$  |
| (c) $8 \bmod 5$    | (i) $8 \bmod 5$    | (o) $77 \bmod 12$  |
| (d) $-8 \bmod 5$   | (j) $-8 \bmod 5$   | (p) $-77 \bmod 12$ |
| (e) $18 \bmod 11$  | (k) $18 \bmod 11$  | (q) $43 \bmod 5$   |
| (f) $-18 \bmod 11$ | (l) $-18 \bmod 11$ | (r) $-43 \bmod 5$  |

### 3. Stosując algorytm Euklidesa obliczyć

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|-----------------------------|---------------------------|--------------------------------|
| (a) $\text{NWD}(120, 14)$   | (g) $\text{NWD}(202, 22)$ | (m) $\text{NWD}(170, 15)$      |
| (b) $\text{NWD}(240, 18)$   | (h) $\text{NWD}(180, 24)$ | (n) $\text{NWD}(220, 125)$     |
| (c) $\text{NWD}(280, 14)$   | (i) $\text{NWD}(135, 15)$ | (o) $\text{NWD}(243, 123)$     |
| (d) $\text{NWD}(2020, 28)$  | (j) $\text{NWD}(115, 30)$ | (p) $\text{NWD}(231, 213)$     |
| (e) $\text{NWD}(2020, 144)$ | (k) $\text{NWD}(285, 20)$ | (q) $\text{NWD}(1187, 533)$    |
| (f) $\text{NWD}(209, 11)$   | (l) $\text{NWD}(120, 16)$ | (r) $\text{NWD}(76501, 29819)$ |

### 4. Stosując algorytm Euklidesa obliczyć:

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|------------------------------|--------------------------------|
| (a) $\text{NWD}(237, 87)$    | (d) $\text{NWD}(2345, 525)$    |
| (b) $\text{NWD}(5720, 4370)$ | (e) $\text{NWD}(1187, 334)$    |
| (c) $\text{NWD}(5333, 187)$  | (f) $\text{NWD}(75012, 27819)$ |

### 5. Wyznaczyć wszystkie rozwiązania w liczbach całkowitych równań:

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|----------------------|---------------------|----------------------|
| (a) $5x + 8y = 1$    | (e) $3x + 7y = 3$   | (i) $17x + 116y = 8$ |
| (b) $5x + 8y = 3$    | (f) $11x + 17y = 5$ | (j) $14x - 11y = 5$  |
| (c) $5x - 12y = 3$   | (g) $7x + 19y = 4$  | (k) $13x - 222y = 3$ |
| (d) $48x - 36y = 12$ | (h) $11x + 31y = 6$ | (l) $17x + 222y = 2$ |