1

$$(123456789, 987654321) = (123456789, 864197532) = (123456789, 740740743) = (123456789, 617283954)$$
$$(123456789, 493827165) = (123456789, 370370376) = (123456789, 246913587) = (123456789, 123456798)$$
$$= (123456789, 9) = 9(9|123456798)$$

2

а)

$$\frac{2n+13}{n+7}$$
$$(2n+13, n+7) = (n+6, n+7) = (n+6, 1) = 1 \to \text{Дробь несократима}$$

б)

$$\frac{2n^2-1}{n+1}$$
$$\left(2n^2-1, n+1\right) = (2n^2-1, 2n^2-2) = (2n^2-1, 1) = 1 \to \text{Дробь несократима}$$

3

$$\left(\frac{b+c}{2}, \frac{a+c}{2}, \frac{a+b}{2}\right) = \left(\frac{b+c}{2} + \frac{a+b}{2} - \frac{a+c}{2}, \frac{a+c}{2} + \frac{a+b}{2} - \frac{b+c}{2}, \frac{a+c}{2} + \frac{b+c}{2} - \frac{a+b}{2}\right) =$$
$$= (a, b, c)$$

4

$$\frac{C_a^b}{a} = \frac{(a-b+1)(a-b+2)\cdots(a-1)}{b!}\blacksquare$$

5

Пусть n>m

$$(f_n, f_m) = (2^{2^n}+1, 2^{2^m}+1) = (2^{2^n}-2^{2^m}, 2^{2^m}+1) = 1.$$

$2^{2^n} - 2^{2^m}$ – делится на степень двойки, а второе число нечетное.