Instructions: We'll use the same whiteboard process until, as a whole class, we decide to use some other process.

1 a,b,c

a. $2x \equiv 4 \pmod 6$

Let $x = 2$, we then see that $2x = 4 \equiv 4 \pmod 6$.

b. $2x \equiv 3 \pmod 6$

Not possible. Mod 6 will preserve parity, as it is even. So $2x$ which is even, cannot be equivalent to 3.

c. $4x \equiv 5 \pmod 6$

By the same property as b we know this is impossible.

-Miah :)

1
d,e,f

1. Determine if it is possible to solve the following equations. You can use any method in this problem including trying all possible x's. (Note: since we are trying to solve congruence equations, you may only need yo try to complete the residue system as your possible x's.)

a. $2x \equiv 4 \pmod 6$

b. $2x \equiv 3 \pmod 6$

c. $4x \equiv 5 \pmod 6$

d. $4x \equiv 2 \pmod 6$ Possible for every integer x such that $x \equiv 2 \pmod 3$

e. $6x \equiv 3 \pmod 9$ Possible for every integer x such that $x \equiv 4 \pmod 6$

f. $6x \equiv 4 \pmod 9$ Impossible

2

Not possible. Mod 6 will preserve parity, as it is even. So 2x which is even, cannot be equivalent to 3.

From Miah's work in 1 b

3

$14x \equiv 2 \pmod{22}$

We can also use the given equation: 2=2*22-3*14. Then x=-3 is a solution. This is equivalent to x=19, and that's 8+11, the other solution mod 22.

$2 = 14x - 22k$

$1 = 7x - 11k$

$\boxed{x = 8}$ $k = 5$

$1 = 56 - 55$

Michael

4

$ax \equiv 1 \pmod 7$

0 never works

a	1	2	3	4	5	6
x	1	4	5	2	3	6

$ax \equiv 1 \pmod{10}$

a	1	2	3	4	5	6	7	8	9
x	1	X	7	X	X	X	3	X	9

Parity is preserved mod 10 so no even 'a' can multiply with anything to be congruent to 1. Multiples of 5 alternate between 5 and 0.

-Nick

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