Firmultiplicative invense of -7 modulo 20: =) We need to kind of such that -7×=1 mod 20.

>if ax = 1 (mod m), then so is the multiplicative inverse of a modulo m.

F=ES 13 (mod 20)

Twe are looking bon an integer of such that 13x = 20k +1 tor some integer we can test values of x: it x=1, 13(1) = 13 \$ 1 mod if $\chi = 2$, $13(2) = 26 \neq 1 \mod 20$ jt x = 3, $13(3) = 39 \neq 1 \mod 20$ 13(4) = 52 ±1 mod 20 4 2 = 4, 13(5) = 65 \$ 1 mod 20 11 25) 13(6) = 78 # 1 mad 26 站 2=5, 13 (7) = 91 # 11 mod 20 it 2 = 6, 13(8) = 104 # 4 mad 20 it 2=3)

it x=9, 13(9) = 117=17 mod 20 it x=10, 13 (16) = 130 = 10 mod 20 it x=11 , 13(11) = 143=3 mod 20 it x=12, 13(12)=156 = 16 mod -20 mod 20 it 2=13, 13(13) = 160= 9 mod 20 it x = 14, 13(14) = 182 = 2 mod 20 it x=15, 13(15)=195=15 mod 20 it x = 16, (13(16) = 208 = 8 mod 20 $i \leftarrow x = 17, 13(17) = 221 = 1$ Thus 1 x = 17 is multiplicative invense 06 13 modulo 20. .. The multiplicative invense of -7 mode 10 20 is 17. * -17 mod 23 : 23)-17(-1 =)-17 = (-1×23)+6 .: - 17 mod 23/= 6 (Ans)

*Multiplication Invense of -13 mod 23; The multiplicative invense of a number a mod mis a number of such that; ax=1 mod m. In our case, we are looking ton a number & such that "eceiver. Fisher meb mes is encapenhaled is popular Fill selection of To simplify, we brinst convert -13 into Alemin a positive equivalent modulo 23. $(11 \text{ bm})^{2} = \epsilon - 13 \text{ mod } 23 = -13 + 23 = 10^{2} \cdot 20^{-1}$ si son es So, the regulation become s: 10x = 1 mod 23gl Amordish Now, we bind the integer a such that 10x = 1 mod 23 mod 23 ib x=1,10x1=10 #1 mod 23 if x=2, 10×2 = 20 \ 1 mod 23if x=3, 10×3=30=7

smother stidle

it x = 4, 10x4 = 40 = 17 mod 23 it x=5, 10x5=50=4 mod 23 it x=6, 10x6=60=14 mod 23 it x=7, ~ 10×7 = 70=1 mod 23 we bound it: 10.7 = 70 = 1 mod 23 Since -13=10 mod 23 and 10-1 mod 23=7 we conclude and prison- on The multiplicative invense of -13 23 is 7 esular test noo on d it x=1, 13(1)=13 # 1 mod 20 34 y = 2, $13(2) = 26 \pm 1$ mod 20 it x= 3, 13(3)=39 # 1 mod 20 8=4, 13(4)=52±1 mod 20 13(5) = (5 = 1 mod 20 好からち。 13(6)=78年1 mの42, if ac = G, 13 (7) = 91 # 12 mad you to 2 pole (8) 81 (F = 20 di