

$$6 = 3, 10, 5, 16, 8, 4, 2, 1$$

$$7 = 22, 11, 34, 17, 52, 26, 13, 40, 20, 10, 5, \\ 16, 8, 4, 2, 1$$

$$8 = 4, 2, 1$$

$$9 = 28, 14, 7, 22, 11, 34, 17, 52, 26, 13, 40, \\ 20, 10, 5, 16, 8, 4, 2, 1$$

$$10 = 5, 16, 8, 4, 2, 1$$

$$11 = 34, 17, 52, 26, 13, 40, 20, 10, 5, 16, 8, 4, \\ 2, 1$$

$$12 = 6, 3, 10, 5, 16, 8, 4, 2, 1$$

$$13 = 40, 20, 10, 5, 16, 8, 4, 2, 1$$

$$14 = 7, 22, 11, 34, 17, 52, 26, 13, 40, 20, 10, 5, \\ 16, 8, 4, 2, 1$$

$$15 = 46, 23, 70, 35, 106, 53, 160, 80, 40, 20, 10, 5, \\ 16, 8, 4, 2, 1$$

$$16 = 8, 4, 2, 1$$

$$17 = 52, 26, 13, 40, 20, 10, 5, 16, 8, 4, 2, 1$$

$$18 = 9, 28, 14, 7, 22, 11, 34, 17, 52, 26, 13, 40, \\ 20, 10, 5, 16, 8, 4, 2, 1$$

$$19 = 58, 29, 88, 44, 22, 11, 34, 17, 52, 26, 13, 40, \\ 20, 10, 5, 16, 8, 4, 2, 1$$

$$20 = 10, 5, 16, 8, 4, 2, 1$$

# HW 21

on to post

$$\begin{aligned} 1) \mu(1) &= 1 & \mu(2) &= (-1)^1 = -1 & \mu(3) &= (-1)^1 = -1 & \mu(4) &= 2^2 = 0 \\ \mu(5) &= -1 & \mu(6) &= 2 \cdot 3 = (-1)^2 = 1 & \mu(7) &= -1 & \mu(8) &= 2 \cdot 2 \cdot 2 = 0 \\ \mu(9) &= 3 \cdot 3 = 0 & \mu(10) &= 2 \cdot 5 = (-1)^2 = 1 & \mu(11) &= -1 & \mu(12) &= 2 \cdot 2 \cdot 3 = 0 \\ \mu(13) &= -1 & \mu(14) &= 2 \cdot 7 = (-1)^2 = 1 & \mu(15) &= 3 \cdot 5 = (-1)^2 = 1 & \mu(16) &= 2^4 = 0 \\ \mu(17) &= -1 & \mu(18) &= 3^2 \cdot 2 = 0 & \mu(19) &= -1 & \mu(20) &= 2^2 \cdot 5 = 0 \end{aligned}$$

$$\begin{aligned} m(1) &= 1 & m(2) &= 0 & m(3) &= -1 & m(4) &= -1 & m(5) &= -2 & m(6) &= -1 \\ m(7) &= 0 & m(8) &= 0 & m(9) &= 0 & m(10) &= 1 & m(11) &= 0 & m(12) &= 0 \\ m(13) &= -1 & m(14) &= 0 & m(15) &= 1 & m(16) &= 1 & m(17) &= 0 & m(18) &= 0 \\ m(19) &= -1 & m(20) &= -1 \end{aligned}$$

2) 4-30 Goldbach Conjecture

$$\begin{aligned} 4 &= 2+2, & 6 &= 3+3, & 8 &= 3+5, & 10 &= 5+5, & 12 &= 5+7 \\ 14 &= 7+7, & 16 &= 11+5, & 18 &= 11+7, & 20 &= 13+7, & 22 &= 11+11 \\ 24 &= 11+13, & 26 &= 13+13, & 28 &= 11+17, & 30 &= 13+17 \end{aligned}$$

$$3) (3, 5) \quad (5, 7) \quad (11, 13) \quad (17, 19)$$

4) Collatz conjecture for all  $n$  2-20

$$2 = 1$$

$$3 = 10, 5, 16, 8, 4, 2, 1$$

$$4 = 2, 1$$

$$5 = 16, 8, 4, 2, 1$$