

*Integer*  
Find the number of solutions

$$X + Y + Z + U + V + W = 23$$

$$X \geq 2, Y \geq 0, Z \geq 6, U \geq 10, V \geq 8, W \geq -7$$

$$(x-1) + (y+1) + (z-5) + (u-9) + (v-7) + (w+8)$$

$$= 10$$

Number of Solutions:

$$\binom{9}{5} = 126$$

$$X + Y + Z + U = 6$$

$$X \geq -8, Y \geq 7, Z \geq 10, U \geq -6$$

$$(x+9)(y-6)(z-9)(u+7)=7$$

Number of Solutions:

$$\binom{6}{3} = 20$$

$$X + Y + Z + U + V + W = -19$$

$$X \geq 1, Y \geq 0, Z \geq -3, U \geq -1, V \geq -9, W \geq -9$$

$$-19+1+4+2+10+10=8$$

Number of Solutions:

$$\binom{7}{5} = 21$$

$$X + Y + Z + U = 19$$

$$X \geq 7, Y \geq -1, Z \geq -3, U \geq 9$$

$$19-6+2+4-8 = 11$$

Number of Solutions:

$$\binom{10}{3} = 120$$

$$X + Y + Z = 25$$

$$X \geq 10, Y \geq -2, Z \geq 10$$

$$25-9+3-9 = 10$$

Number of Solutions:

$$\binom{9}{2} = 36$$

$$X + Y + Z + U = 5$$

$$X \geq -2, Y \geq -1, Z \geq 6, U \geq -3$$

$$5+3+2-5+4=9$$

Number of Solutions:

$$\binom{8}{3} = 56$$

$$X + Y + Z = 3$$

$$X \geq -5, Y \geq -4, Z \geq 7$$

$$3+6+5-6=8$$

Number of Solutions:

$$\binom{7}{2} = 21$$

$$X + Y + Z + U + V + W = -24$$

$$X \geq 2, Y \geq -10, Z \geq -4, U \geq -9, V \geq -3, W \geq -5$$

$$-24-1+11+5+10+4+6=11$$

Number of Solutions:

$$\binom{10}{5} = 252$$

$$X + Y + Z + U = -9$$

$$X \geq 2, Y \geq -2, Z \geq -5, U \geq -7$$

$$-9-1+3+6+8=7$$

Number of Solutions:

$$\binom{6}{3} = 20$$

$$X + Y + Z + U + V + W = 15$$

$$X \geq 1, Y \geq 4, Z \geq 6, U \geq 7, V \geq -6, W \geq 2$$

$$15-3-5-6+7-1=7$$

Number of Solutions:

$$\binom{6}{5} = 6$$

$$X + Y + Z + U = 14$$

$$X \geq -3, Y \geq 4, Z \geq 3, U \geq 3$$

$$14+4-3-2-2=11$$

Number of Solutions:

$$\binom{10}{3} = 120$$

$$X + Y + Z + U = -21$$

$$X \geq -5, Y \geq -9, Z \geq -10, U \geq 0$$

$$-21+6+10+11+1=7$$

Number of Solutions:

$$\binom{6}{3} = 20$$

$$X + Y + Z + U + V + W = 6$$

$$X \geq 2, Y \geq -7, Z \geq 1, U \geq 2, V \geq 6, W \geq -3$$

$$6-1+8-1-5+4=11$$

Number of Solutions:  
 $\binom{10}{5} = 252$

$$X + Y + Z + U = 9$$

$$X \geq 0, Y \geq 5, Z \geq -2, U \geq 0$$

$$9+1-4+3+1=10$$

Number of Solutions:  
 $\binom{9}{3} = 84$

$$X + Y + Z + U = 10$$

$$X \geq 8, Y \geq -6, Z \geq -4, U \geq 9$$

$$10-7+7+5-8=7$$

Number of Solutions:  
 $\binom{6}{3} = 20$

$$X + Y + Z + U = 0$$

$$X \geq 5, Y \geq -8, Z \geq 5, U \geq -7$$

$$0-4+9-4+8=9$$

Number of Solutions:  
 $\binom{8}{3} = 56$

$$X + Y + Z + U = 7$$

$$X \geq -7, Y \geq 5, Z \geq 4, U \geq 1$$

$$7+8-4-3=8$$

Number of Solutions:  
 $\binom{7}{3} = 35$

$$X + Y + Z + U + V = -29$$

$$X \geq -1, Y \geq -8, Z \geq -4, U \geq -10, V \geq -9$$

$$-29+2+9+5+11+10=8$$

Number of Solutions:  
 $\binom{7}{4} = 35$

$$X + Y + Z = 23$$

$$X \geq 5, Y \geq 10, Z \geq 4$$

$$23 - 4 - 9 - 3 = 7$$

Number of Solutions:

$$\binom{6}{2} = 15$$

$$X + Y + Z = 7$$

$$X \geq 3, Y \geq 1, Z \geq -5$$

$$7 - 2 + 6 = 11$$

Number of Solutions:

$$\binom{10}{2} = 45$$

$$X + Y + Z = -4$$

$$X \geq -9, Y \geq 6, Z \geq -9$$

$$-4 + 10 - 5 + 10 = 11$$

Number of Solutions:

$$\binom{10}{2} = 45$$

$$X + Y + Z + U = 5$$

$$X \geq 4, Y \geq 1, Z \geq -1, U \geq -6$$

$$5 - 3 + 2 + 7 = 11$$

Number of Solutions:

$$\binom{10}{3} = 120$$

$$X + Y + Z + U + V + W = 31$$

$$X \geq 7, Y \geq 1, Z \geq -2, U \geq 9, V \geq 7, W \geq 8$$

$$31 - 6 + 3 - 8 - 6 - 7 = 7$$

Number of Solutions:

$$\binom{6}{5} = 6$$

$$X + Y + Z + U + V + W = 4$$

$$X \geq 5, Y \geq -4, Z \geq 6, U \geq -4, V \geq 2, W \geq -4$$

$$4 - 4 + 5 - 5 + 5 - 1 + 5 = 9$$

Number of Solutions:

$$\binom{8}{5} = 56$$

$$X + Y + Z + U + V = 33$$

$$X \geq 10, Y \geq -2, Z \geq 9, U \geq 7, V \geq 3$$

$$33-9+3-8-6-2=11$$

Number of Solutions:

$$\binom{10}{4} = 210$$

$$X + Y + Z = 24$$

$$X \geq 0, Y \geq 9, Z \geq 8$$

$$24+1-8-7=10$$

Number of Solutions:

$$\binom{9}{2} = 36$$

$$X + Y + Z + U + V = 9$$

$$X \geq -6, Y \geq 3, Z \geq 5, U \geq 5, V \geq 0$$

$$9+7-2-4-4+1=7$$

Number of Solutions:

$$\binom{6}{4} = 15$$

$$X + Y + Z + U = 14$$

$$X \geq 9, Y \geq -7, Z \geq 2, U \geq 3$$

$$14-8+8-1-2=11$$

Number of Solutions:

$$\binom{10}{3} = 120$$

$$X + Y + Z + U + V + W = 15$$

$$X \geq 10, Y \geq -4, Z \geq 4, U \geq 2, V \geq 7, W \geq -5$$

$$15-9+5-3-1-6+6=7$$

Number of Solutions:

$$\binom{6}{5} = 6$$

$$X + Y + Z + U + V = 23$$

$$X \geq 0, Y \geq -2, Z \geq 2, U \geq 10, V \geq 10$$

$$23+1+3-1-9-9=8$$

Number of Solutions:

$$\binom{7}{4} = 35$$

$$X + Y + Z + U + V = 5$$

$$X \geq -8, Y \geq -1, Z \geq 7, U \geq 7, V \geq -6$$

$$5+9+2-6-6+7=11$$

Number of Solutions:  
 $\binom{10}{4} = 210$

$$X + Y + Z + U + V = 17$$

$$X \geq 9, Y \geq 7, Z \geq -1, U \geq -6, V \geq 2$$

$$17-8-6+2+7-1=11$$

Number of Solutions:  
 $\binom{10}{4} = 210$

$$X + Y + Z + U = 5$$

$$X \geq 1, Y \geq 1, Z \geq -1, U \geq -2$$

$$5+2+3=10$$

Number of Solutions:  
 $\binom{9}{3} = 84$

$$X + Y + Z + U = 18$$

$$X \geq 4, Y \geq -1, Z \geq 3, U \geq 5$$

$$18-3+2-2-4=11$$

Number of Solutions:  
 $\binom{10}{3} = 120$

$$X + Y + Z + U + V = -2$$

$$X \geq -9, Y \geq 10, Z \geq -10, U \geq -4, V \geq 8$$

$$-2+10-9+11+5-7=8$$

Number of Solutions:  
 $\binom{7}{4} = 35$

$$X + Y + Z + U + V = 19$$

$$X \geq 10, Y \geq -4, Z \geq 3, U \geq 10, V \geq -2$$

$$19-9+5-2-9+3=7$$

Number of Solutions:  
 $\binom{6}{4} = 15$

$$\begin{aligned}X + Y + Z + U &= 6 \\X \geq 7, Y \geq 5, Z \geq -9, U \geq -4\end{aligned}$$

$$6-6-4+10+5=11$$

Number of Solutions:  
 $\binom{10}{3} = 120$

$$\begin{aligned}X + Y + Z + U &= 18 \\X \geq 8, Y \geq -2, Z \geq 8, U \geq 1\end{aligned}$$

$$18-7+3-7=7$$

Number of Solutions:  
 $\binom{6}{3} = 20$

$$\begin{aligned}X + Y + Z + U &= 14 \\X \geq -1, Y \geq 8, Z \geq 2, U \geq -1\end{aligned}$$

$$14+2-7-1+2=10$$

Number of Solutions:  
 $\binom{9}{3} = 84$

$$\begin{aligned}X + Y + Z + U + V &= 12 \\X \geq -4, Y \geq 9, Z \geq -5, U \geq 6, V \geq 4\end{aligned}$$

$$12+5-8+6-5-3=7$$

Number of Solutions:  
 $\binom{6}{4} = 15$

$$\begin{aligned}X + Y + Z + U &= 25 \\X \geq 5, Y \geq -1, Z \geq 8, U \geq 8\end{aligned}$$

$$25-4+2-7-7=9$$

Number of Solutions:  
 $\binom{8}{3} = 56$

$$\begin{aligned}X + Y + Z + U + V &= 31 \\X \geq 8, Y \geq 0, Z \geq 7, U \geq 5, V \geq 5\end{aligned}$$

$$31-7+1-6-4-4=11$$

Number of Solutions:  
 $\binom{10}{4} = 210$

$$X + Y + Z + U + V = -9$$

$$X \geq -5, Y \geq 8, Z \geq 3, U \geq -7, V \geq -10$$

$$-9+6-7-2+8+11=7$$

Number of Solutions:  
 $\binom{6}{4} = 15$

$$X + Y + Z + U + V + W = 5$$

$$X \geq 9, Y \geq -7, Z \geq -10, U \geq 10, V \geq -7, W \geq 9$$

$$5-8+8+11-9+8-8=7$$

Number of Solutions:  
 $\binom{6}{5} = 6$

$$X + Y + Z + U = -15$$

$$X \geq -9, Y \geq 2, Z \geq -2, U \geq -9$$

$$-15+10-1+3+10=7$$

Number of Solutions:  
 $\binom{6}{3} = 20$

$$X + Y + Z + U + V + W = 26$$

$$X \geq -3, Y \geq 7, Z \geq 4, U \geq 8, V \geq 3, W \geq 3$$

$$26+4-6-3-7-2-2=10$$

Number of Solutions:  
 $\binom{9}{5} = 126$

$$X + Y + Z + U + V = -6$$

$$X \geq -2, Y \geq 3, Z \geq -2, U \geq -4, V \geq -4$$

$$-6+3-2+3+5+5=8$$

Number of Solutions:  
 $\binom{7}{4} = 35$

$$X + Y + Z = 6$$

$$X \geq -2, Y \geq 8, Z \geq -7$$

$$6+3-7+8=10$$

Number of Solutions:  
 $\binom{9}{2} = 36$

$$X + Y + Z + U = 16$$
$$X \geq 4, Y \geq 2, Z \geq 10, U \geq -7$$

$$16-3-1-9+8=11$$

Number of Solutions:

$$\binom{10}{3} = 120$$

$$X + Y + Z + U + V + W = 6$$
$$X \geq 2, Y \geq 2, Z \geq -7, U \geq -2, V \geq -1, W \geq 7$$

$$6-1-1+8+3+2-6=11$$

Number of Solutions:

$$\binom{10}{5} = 252$$