Satisfying Statements

Can you find some two-digit numbers that belong in two of the sets?
10,15,21,30,45,55,60,66,75,78

Can you find some two-digit numbers that belong in three sets?
10,30,66,78,90

What is the smallest number that belongs in all four sets?
1770
Explanation:
Step 1: List all triangular numbers

1	3	6	10	15	21	28	36	45	55
66	78	91	105	120	136	153	171	190	210
231	253	276	300	325	351	378	406	435	465
496	528	561	595	630	666	703	741	780	820
861	903	946	990	1035	1081	1128	1176	1225	1275
1326	1378	1431	1485	1540	1596	1653	1711	1770	1830
1891	1953	2016	2080	2145	2211	2278	2346	2415	2485
2556	2628	2701	2775	2850	2926	3003	3081	3160	3240
3321	3403	3486	3570	3655	3741	3828	3916	4005	4095
4186	4278	4371	4465	4560	4656	4753	4851	4950	5050

Step 2: List out multiples of 10 (Satisfy Alison and Some of Sam) but not 100 (doesn't satisfy Sam).
Step 3: Check if number divisible by 3 but not 9

	Alison **5n**	Sam **4n-2**	Becky **n(n+1)/2**	Matt
10	✔	✔	✔	x
120	✔	x	✔	✔

190	✔	✔	✔	x
210	✔	✔	✔	x
630	✔	✔	✔	x
780	✔	x	✔	x
820	✔	x	✔	x
990	✔	✔	✔	x
1540	✔	x	✔	x
1770	✔	✔	✔	✔

Can you find some two-digit numbers that belong in two of the sets.

Explanation:

Numbers common between Alison and Becky

Alison writes "Multiples of five".

Becky writes "Triangular numbers".

Step 1: Write all triangular number….

1,3,6,10,15,21,28,36,45,55,66,78,91

Step 2: From the list find the multiples of 5

Ans: 10,15,45,55,....

Numbers common between Alison and Sam

Alison writes "Multiples of five".

Sam writes "Even, but not multiples of four".

Step 1: List all Sam’s number

Logic - **4n-2**
2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74
,78,82,86,90,94,98
Step 2: From the list find the multiples of 5

Ans:10,30,50,70,90
Pattern:Increases by 20 after the number 10

Numbers common between Alison and Matt
Alison writes "Multiples of five".
Step 1:List all of Matt's numbers
3,6,12,15,21,24,30,33,39,42,48,51,57,60,66,69,75,78,84
,87,93,96
Step 2:From the list find the multiples of 5
Ans:15,30,60,75
Pattern:First increase by 15,Next number increase by 30.

Becky writes "Triangular numbers".
Matt writes "Multiples of three but not multiples of nine".
Step 1:List triangular numbers
1,3,6,10,15,21,28,36,45,55,66,78,91

Step 2:List Matt's numbers
3,6,12,15,21,24,30,33,39,42,48,51,57,60,66,69,75,78,84
,87,93,96
Step 3:Find similarities
Ans:15,21,66,78

Becky writes "Triangular numbers".
Sam writes "Even, but not multiples of four".
Step 1: List triangular numbers
1,3,6,10,15,21,28,36,45,55,66,78,91

Step 2:List Sam's numbers
2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74
,78,82,86,90,94,98

Step 3 : Find similarities
Ans:10,66,78,190,210

Can you find some two-digit numbers that belong in three sets?
Alison **5n**
5,10,15,20,25,30,35,40,45,50,55,60,65,70,75,80,85,90
,95
Becky **n(n+1)/2**
1,3,6,10,15,21,28,36,45,55,66,78,91
Sam **4n-2**
2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74
,78,82,86,90,94,98
Answer: 10

Alison **5n**

5,10,15,20,25,30,35,40,45,50,55,60,65,70,75,80,85,90
,95

Sam 4n-2

2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74
,78,82,86,90,94,98

Matt

3,6,12,15,21,24,30,33,39,42,48,51,57,60,66,69,75,78,84
,87,93,96

Answer:30,90

Becky n(n+1)/2

1,3,6,10,15,21,28,36,45,55,66,78,91

Sam 4n-2

2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74
,78,82,86,90,94,98

Matt

3,6,12,15,21,24,30,33,39,42,48,51,57,60,66,69,75,78,84
,87,93,96

Answer: 66,78

Alison 5n

5,10,15,20,25,30,35,40,45,50,55,60,65,70,75,80,85,90
,95

Matt

3,6,12,15,21,24,30,33,39,42,48,51,57,60,66,69,75,78,84
,87,93,96

Becky n(n+1)/2

1,3,6,10,15,21,28,36,45,55,66,78,91

Answer: None