SHIFTING TIMES TABLES

Count 1 to 100 in 4s saying the 4 times table: 4, 8, 12, 16, 20, … 80, 84, 88, …

Now shift the 4 times table up 3 and count in 4s again starting from 7:

7, 11, 15, 19, 23, … 83, 87, 87, 91, …

This diagram shows a Function Machine, also called a mapping diagram. You input numbers into the black box and the machine outputs a number.

How does this mapping diagram represent shifting the 4 times table by 3?

Which tables were shifted to give the following sequences? By how much?
Explain how you know.

(a) 7, 12, 17, 22, 27, … 82, 87, 92, …

(b) 9, 11, 13, 15, 17, … 89, 91, 93, …

(c) 13, 20, 27, 34, 41, … 83, 90, 97, …

(d) 4, 7, 10, 13, 16, … 79, 82, 85, …

(e) 5, 11, 17, 23, 29, … 71, 77, 83, …

Match each of the following rules for mapping the input numbers $n = 1, 2, 3 …$ to output numbers in the sequences above. Explain how you do this.

(1) $n \rightarrow 7n + 6$

(2) $n \rightarrow 5n + 2$

(3) $n \rightarrow 3n + 1$
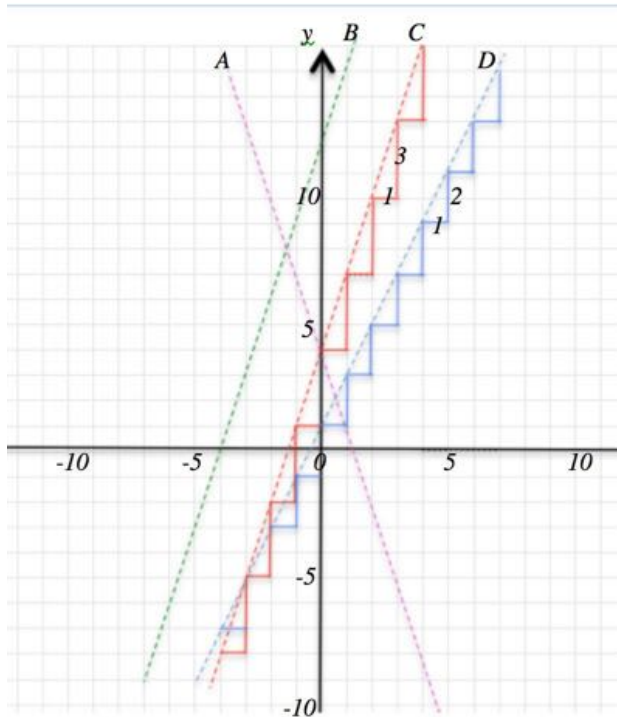
(4) $n \rightarrow 6n - 1$

(5) $n \rightarrow 2n + 7$

Now make up your own sequence and rule.

HELP

How well do you know your multiplication tables? It's a handicap not to know your tables but it's never too late to learn. You might like to play the game at https://www.education.com/game/radar-arrays and see how speedy you can get.

Counting 4, 8, 12, 16 ,... is called SKIP COUNTING and the numbers in the sequence are called MULTIPLES OF 4. It might help you to be more successful in maths if you practise skip counting up to 100 (or 150) in all the sequences 2s, 3s, 4s, all the way up to 10s (that's an easy one). The best way to do this is to write out the sequence. Then read it aloud to yourself a few times. Then cover it so you can't see it. Then repeat it without looking at the list you wrote down until you can do it without hesitation.

NEXT

Continue the following sequences for the next 3 terms and continue the sequences backwards to the previous 3 terms:
7, 10, 13, 16, 19, ...
15, 18, 21, 24, 27, ...
1, -2, -5, -8, -11, ...

The first 2 sequences come from a multiplication table shifted up. Which multiplication table is it?
What do you notice about the third sequence? How do the sequences relate to the red steps in the diagram?

How do these sequences relate to the lines A, B and C in the diagram?
Which sequence relates to which line?

https://aiminghigh.aimssec.ac.za/steps/

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of 2

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of 3

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of 4

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of 5

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of 6

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of 7

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of 8

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of 9

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of 10

See https://aiminghigh.aimssec.ac.za/multiple-patterns/