IIITB COMET FOUNDATION

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Logic Circuit Comparison

Question: For any set of inputs A and B, the given circuits produce the same output, except one. Which one is it?

1. **(A) Expression:** $(A \oplus B) \cdot B'$

A	B	$A \oplus B$	B'	$(A \oplus B) \cdot B'$
0	0	0	1	0
0	1	1	0	0
1	0	1	1	1
1	1	0	0	0

2. **(B) Expression:** $A \cdot B'$

A	B	$A \cdot B'$
0	0	0
0	1	0
1	0	1
1	1	0

3. **(C) Expression:** $A \cdot B' + B' \cdot A \cdot B$

   Note that $B' \cdot A \cdot B = 0$, since $B' \cdot B = 0$. So this simplifies to $A \cdot B'$, same as (B).

A	B	B'	$A \cdot B'$	$A \cdot B' \cdot B$	Result
0	0	1	0	0	0
0	1	0	0	0	0
1	0	1	1	0	1
1	1	0	0	0	0

4. **(D) Expression:** $A' + B$

A	B	A'	$A' + B$
0	0	1	1
0	1	1	1
1	0	0	0
1	1	0	1

Conclusion

The outputs of circuits **(A)**, **(B)**, and **(C)** are all the same: $[0, 0, 1, 0]$.
However, the output of circuit **(D)** is: $[1, 1, 0, 1]$, which is different.

Therefore, the answer is: (D).