Boolean expressions worksheet

Simplify the Boolean expressions below, using truth tables and/or De Morgan's laws. The first one has been done for you.

1 $\overline{A + B \cdot \overline{A}}$

The truth table for this expression is

A	B	A	B.A	A+B.A	A+B.A
0	0	1	0	0	1
0	1	1	1	1	0
1	0	0	0	1	0
1	1	0	0	1	0

The expression that gives a 1 in the first row is $\overline{A} \cdot \overline{B}$

Using De Morgan, this equals $\overline{\overline{A} + \overline{B}}$

which gives the expression $\overline{A + B}$ or A NOR B

2 $\overline{A \cdot (B + \overline{A})}$

3 $A \cdot (\overline{A} + B) + B \cdot (A + \overline{B})$

4 $\overline{A} + (\overline{B + A})$

5 $\overline{A \cdot \overline{B} + (A + \overline{A}) \cdot \overline{B}}$

6 $\overline{A.\overline{B} + \overline{A}.\overline{B} + \overline{A}.B}$

7 $(\overline{A} + A.B) \cdot \overline{B}$

8 $\overline{(A.\overline{B}) \cdot A} + \overline{B}$

9 $A + \overline{\overline{B} \cdot \overline{C}}$

10 $\overline{A.C + A.B + B.\overline{C} + \overline{A}.C}$

Note: your truth tables for questions 9 and 10 will need eight rows, not four.