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Consider the Boolean algebra $(\{0,1\},+,\cdot,^{-})$ as seen in class.
Consider the Boolean function F defined by the table below:

x	y	z	$F(x,y,z)$
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

Which one of the statements below is correct?

A. The sum-of-products expansion of F is the sum of 8 minterms.
B. The sum-of-products expansion of F is the sum of 6 minterms.
C. The sum-of-products expansion of F is the sum of 2 minterms.
D. None of the above

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Consider the Boolean algebra $(\{0,1\},+,\cdot,^{-})$ as seen in class.
Consider the statements below:

(i) The NOR operation is defined by: $x \downarrow y = \overline{x+y}$
(ii) The Boolean expression $\overline{x}$ is equivalent to a Boolean expression that involves no other Boolean operation than $\downarrow$
(iii) The Boolean expression $x+y$ is equivalent to a Boolean expression that involves no other Boolean operation than $\downarrow$
(iv) The Boolean expression $x \cdot y$ is equivalent to a Boolean expression that involves no other Boolean operation than $\downarrow$
(v) $\{\downarrow\}$ is functionally complete

How many of these five statements are correct?

A. 1
B. 2
C. 3
D. 4
E. 5

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A. We have: $\neg(\forall u, P(u)) \equiv \forall u, \neg P(u)$
B. We have: $\neg(\forall u, P(u)) \equiv \exists u, P(u)$
C. We have: $\neg(\forall u, P(u)) \equiv \exists u, \neg P(u)$
D. None of the above

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Consider the following statements:

(i) $\exists u, (P(u) \vee Q(u)) \equiv (\exists u, P(u)) \vee (\exists u, Q(u))$
(ii) $\exists u, (P(u) \wedge Q(u)) \equiv (\exists u, P(u)) \wedge (\exists u, Q(u))$

A. The only correct statement is (i)
B. The only correct statement is (ii)
C. Both statements are correct
D. None of these statements is correct

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Consider the following statements:

(i) $\forall u, (P(u) \vee Q(u)) \equiv (\forall u, P(u)) \vee (\forall u, Q(u))$
(ii) $\forall u, (P(u) \wedge Q(u)) \equiv (\forall u, P(u)) \wedge (\forall u, Q(u))$

A. The only correct statement is (i)
B. The only correct statement is (ii)
C. Both statements are correct
D. None of these statements is correct

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Consider the following statements:

(i) $\exists u, (\exists v, P(u,v)) \equiv \exists v, (\exists u, P(u,v))$
(ii) $\forall u, (\forall v, P(u,v)) \equiv \forall v, (\forall u, P(u,v))$

A. The only correct statement is (i)
B. The only correct statement is (ii)
C. Both statements are correct
D. None of these statements is correct

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Consider the following statements:

(i) $\exists u, (\forall v, P(u,v)) \equiv \forall v, (\exists u, P(u,v))$
(ii) $\forall u, (\exists v, P(u,v)) \equiv \exists v, (\forall u, P(u,v))$

A. The only correct statement is (i)
B. The only correct statement is (ii)
C. Both statements are correct
D. None of these statements is correct

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Consider the following expressions:

(i) $(\exists v, \neg P(v)) \rightarrow (\forall v, P(u))$
(ii) $(\exists v, \neg P(v)) \rightarrow (\forall u, P(v))$

A. The only correct predicate expression is (i)
B. The only correct predicate expression is (ii)
C. Both expressions are correct predicate expressions
D. None of them are correct predicate expressions

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Consider the following expressions:

(i) $\exists u, [(\forall v, P(u,v)) \vee Q(v)]$
(ii) $\exists u, [(\forall u, P(u,u)) \vee Q(u)]$

A. The only correct predicate expression is (i)
B. The only correct predicate expression is (ii)
C. Both expressions are correct predicate expressions
D. None of them are correct predicate expressions

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Consider the following predicate expression:

$$\exists u, [(\forall v, P(u,v)) \vee Q(u)]$$

A. The scope of the existential quantifier is $[(\forall v, P(u,v)) \vee Q(u)]$
B. The scope of the existential quantifier is $\forall v, P(u,v)$
C. The scope of the existential quantifier is $P(u,v)$
D. The scope of the existential quantifier is $Q(u)$
E. None of the above