QUIZ 4

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Let ★ and ❖ be two binary operations on a set S.
★ is **distributive** over ❖ iff for any (u,v,w) in S^3 we have:

(i) u★(v❖w)=(u★v)❖(u★w)
(ii) u❖(v★w)=(u❖v)★(u❖w)
(iii) u★(v❖w)=(u★v)❖(u★w) and u❖(v★w)=(u❖v)★(u❖w)

How many of the three statements above are correct?

A. 0
B. 1
C. 2
D. 3

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Let ★ be a binary operation on a set S.
An element u of S is a **neutral element** for ★ iff:

(i) for any element v of S we have u★v=u
(ii) for any element v of S we have u★v=v
(iii) for any element v of S we have u★v=0

How many of the three statements above are correct?

A. 0
B. 1
C. 2
D. 3

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(i) ⌐ denotes the negation
(ii) ∨ denotes the conjunction and ∧ the disjunction
(iii) ↔ denotes the conditional

How many of the three statements above are correct?

A. 0
B. 1
C. 2
D. 3

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Consider the following truth table:

p	q	p→q
F	F	
F	T	
T	F	
T	T	

In how many cases is p→q true?

A. 0
B. 1
C. 2
D. 3
E. 4

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Consider the following truth table:

p	q	p↔q
F	F	
F	T	
T	F	
T	T	

In how many cases is p↔q true?

A. 0
B. 1
C. 2
D. 3
E. 4

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Consider the following laws:

(i) associative laws
(ii) complement laws
(iii) domination laws
(iv) idempotent laws

How many of these laws come from the definition of a Boolean algebra, i.e., are not derived from other laws?

A. 0
B. 1
C. 2
D. 3
E. 4

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QUIZ 4

In the following question, $(B,+,\cdot,^{-})$ is a Boolean algebra.
The zero element is denoted by 0 and the unit element by 1.

Consider the following statements:

$\bar{0} = \bar{0} + 0$
$\bar{0} = \bar{0} + \bar{0}$
$\bar{0} = \bar{0} + 1$
$\bar{0} = 0 + \bar{1}$

How many of these four statements are correct?

A. 0
B. 1
C. 2
D. 3
E. 4

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QUIZ 4

In the following question, $(B,+,\cdot,^{-})$ is a Boolean algebra.
The zero element is denoted by 0 and the unit element by 1.

Consider the following statements:

(i) + is idempotent
(ii) + is distributive over $\cdot$
(iii) there is a neutral element for +
(iv) there is an absorbing element for +

How many of these four statements are correct?

A. 0
B. 1
C. 2
D. 3
E. 4

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In the following question, $(B,+,\cdot,^{-})$ is a Boolean algebra.
The zero element is denoted by 0 and the unit element by 1.

Consider the following statements,
where u, v and w denote three elements of B:

(i) if v=w then u+v=u+w
(ii) if u+v=u+w then v=w
(iii) if u+v=w then u=w−v
(iv) if u+v=u then v=0

How many of these four statements are correct?

A. 0
B. 1
C. 2
D. 3
E. 4

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In the following question, $(B,+,\cdot,^{-})$ is a Boolean algebra.
The zero element is denoted by 0 and the unit element by 1.

Consider the following Boolean expressions:

(i) $x + \bar{x} + y$
(ii) $\bar{x} + \bar{y} + \bar{z}$
(iii) $x \cdot \bar{x} \cdot y$
(iv) $\bar{x} \cdot \bar{y} \cdot \bar{z}$

How many of these expressions are minterms of degree 3?

A. 0
B. 1
C. 2
D. 3
E. 4

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In the following question, $(B,+,\cdot,^{-})$ is a Boolean algebra.
The zero element is denoted by 0 and the unit element by 1.

Which Boolean expression is dual to $(x \cdot \bar{y}) + (z + 0)$?

A. $(\bar{x} \cdot y) + (\bar{z} + 1)$
B. $(x + \bar{y}) \cdot (z \cdot 0)$
C. $(x + \bar{y}) \cdot (z \cdot 1)$
D. $(\bar{x} + y) \cdot (\bar{z} \cdot 1)$
E. None of the above

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QUIZ 4

In the following question, $(B,+,\cdot,^{-})$ is a Boolean algebra.
The zero element is denoted by 0 and the unit element by 1.

Consider the following statements,
where u, v and w denote elements of B:

(i) 0 and 1 are dual
(ii) $\overline{u}+v$ and $\overline{u}\cdot v$ are dual
(iii) $u\cdot(\overline{v+w})$ and $u+(\overline{v}\cdot w)$ are dual

How many of the three statements above are correct?

A. 0
B. 1
C. 2
D. 3