How many tuples (p, q, r, s) that make the following proposition False?

$$(\neg p \vee q \vee \neg r \vee s) \wedge (p \vee \neg q \vee \neg r \vee s)$$

The correct answer is: 2\

Let *p*, *q* and *r* be propositions:

***p*: You go to class regularly**

***q*: You do all homework problems**

***r*: You receive good grades**

Translate the sentence into logical expression:

" You receive good grades if and only if you go to class regularly and doing all homework problems".

The correct answer is: $r \leftrightarrow (p \wedge q)$

Let *p*, *q* be two propositions. Which propositions are logically equivalent to $\neg p \oplus q$?

The correct answer is: $(\neg p \vee q) \wedge (p \vee \neg q)$ → Yes, $(\neg p \vee q) \oplus (p \vee \neg q)$ → No, $(\neg p \vee q) \vee (p \vee \neg q)$ → No

Let *p*, *q* be two propositions. Which propositions are logically equivalent to $p \leftrightarrow q$?

The correct answer is: $(p \vee q) \wedge (\neg p \vee \neg q)$ → No, $(p \wedge q) \vee (\neg p \vee \neg q)$ → No, $(p \vee q) \oplus (\neg p \vee \neg q)$ → Yes

Let *P*(*x*) be a propositional function with domain {–1, 0, 1}

Which proposition on the left has the same truth value as the proposition on the right?

The correct answer is: $\exists x((x \neq 1) \wedge P(x))$ → P(-1) v P(0), $\exists x \neg P(x)$ → ¬P(-1) v ¬P(0) v ¬P(1), $\forall x((x \neq 1) \rightarrow \neg P(x))$ → ¬ P(-1) ^ ¬ P(0)

Let:

***P*(*x*) = "*x* can swim"**

***Q*(*x*) = "*x* is healthy"**

Match the proposition on the left with the sentence on the right

The correct answer is: $\forall x(P(x) \to Q(x))$ → Any one who can swim is healthy, $\exists x(P(x) \wedge \neg Q(x))$ → Some one can swim but is not healthy, $\forall x(Q(x) \to P(x))$ → Any healthy person can swim, $\exists x(\neg P(x) \wedge Q(x))$ → Some one can not swim but is healthy

Given the hypotheses:

- **If I am lucky then I will pass the exam**
- **If I do all homework problems then I will pass the exam**
- **I passed the exam.**

Which statement can be deduced from the above hypotheses?

The correct answer is: None of the other choices is correct

Find the negation of
$\forall x \forall y(\exists z T(x,y,z) \wedge Q(x,y))$

The correct answer is: $\exists x \exists y(\forall z \neg T(x,y,z) \vee \neg Q(x,y))$.

Let U = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}. Represent the subset A = {2, 5, 7,8, 9, 10} by a bit string where the i-th bit is 1 if and only if i is in A.

The correct answer is: 100101111

Find the cardinality of the set { a, { a }, { a, { a } } }.

The correct answer is: 3

Choose correct answer:

The correct answer is: $\lfloor x+y \rfloor = \lfloor x \rfloor + \lfloor y \rfloor$, for all real numbers x, y. → No, $\lfloor 2x \rfloor = 2\lfloor x \rfloor$, for all real numbers x → No, $\lceil (\lfloor x \rfloor) \rceil = \lfloor x \rfloor$, for all real numbers x → Yes

Let f(X) = 5X + 4, g(X) = 4X + 3. Suppose that f o g (X) = aX + b. Find a + b.

The correct answer is: 39

Let f: Z x Z --> Z, f(m, n) = n+1. Choose correct answer:

The correct answer is: f is onto but not one-to-one

Compute

$$\sum_{i=5}^{10}(2^{i+1}-2^{i}).$$

The correct answer is: 2016

Find

$$(11011001 \oplus 00001111) \wedge 11101101$$

The correct answer is: 11000100

Let *p*, *q* and *r* be propositions:

***p*: You go to class regularly**

***q*: You do all homework problems**

***r*: You receive good grades**

Translate the sentence into logical expression:

" If you go to class regularly and do all homework problems you will receive good grades".

The correct answer is: $(p \wedge q) \rightarrow r$

Which propositions are contradiction?

The correct answer is: $(p \rightarrow q) \wedge (q \rightarrow p) \wedge (p \oplus q)$ → Yes, $(p \rightarrow q) \vee (q \rightarrow p) \vee (p \oplus q)$ → No, $[(p \rightarrow q) \vee (q \rightarrow p)] \wedge (p \oplus q)$ → No

Let *p*, *q* be two propositions. Which propositions are logically equivalent to $p \rightarrow q$?

The correct answer is: $\neg q \rightarrow \neg p$ → Yes, $\neg p \rightarrow q$ → No, $\neg p \rightarrow \neg q$ → No, $\neg q \rightarrow p$ → No

Let *P*(*x*) be a propositional function with domain {–1, 0, 1}

Which proposition on the left has the same truth value as the proposition on the right?

The correct answer is: $\forall x P(x)$ → P(-1)^P(0)^P(1), $\exists x P(x) \wedge \forall x((x \neq 0) \rightarrow \neg P(x))$ → ¬P(-1)^P(0)^¬P(1), $\forall x((x \neq 0) \rightarrow P(x)) \wedge \exists x \neg P(x)$ → P(-1)^¬P(0)^P(1)

Let E(x, y) = "x emails y".

Translate the sentence into logical expression, domain is all people.

"Each person has sent email to another person"

The correct answer is: $\forall x \exists y ((x \neq y) \wedge E(x,y))$

Given an argument:

"*If Jack is a soccer player then Jack is rich. Jack is not rich. Therefore Jack is not a soccer player.*"

Choose correct statement:

The correct answer is: This valid argument is based on modus tollens

Find the negation of
$\exists x \forall y (\exists z T(x,y,z) \wedge Q(x,y))$

The correct answer is: $\forall x \exists y (\forall z \neg T(x,y,z) \vee \neg Q(x,y))$.

Which statements are true? (A, B are sets)

The correct answer is: {1, 2, 2, 3, 5} = {1, 2, 3, 5} → True, $Œ = \{Œ\}$ → False, $\overline{A \cap B} = \overline{A} \cup \overline{B}$ → True, $A \cap B = B \cap A$. → True

1 is an element of which set?

The correct answer is: $\{1, \{1\}\}$

Compute $\left\lfloor \frac{3}{2} + \left\lceil 3 + \frac{4}{5} \right\rceil \right\rfloor$

The correct answer is: 5

Let f(X) = 5X + 4, g(X) = 4X + 3. Suppose that f o g (X) = aX + b. Find a + b.

The correct answer is: 39

Compute $\left\lfloor \frac{3}{2} - \left\lceil 3 + \frac{5}{4} \right\rceil \right\rfloor$

The correct answer is: -4

Let f: Z x Z --> Z, f(m, n) = n+1. Choose correct answer:

The correct answer is: f is onto but not one-to-one

Compute $\sum_{j=0}^{3}\sum_{i=0}^{2} ij$

The correct answer is: 18

Which compound proposition is True when *p* = *q* = *r* = *F*, and is False otherwise?

The correct answer is: $\neg p \wedge \neg q \wedge \neg r$

***Let p, q* be propositions:**

p = "You do all homework problems"

***q* = "You receive good grades"**

Translate the sentence into logical expression:

"It is necessary that you do all homework problems to receive good grades."

The correct answer is: $q \rightarrow p$

Which propositions are tautology?

The correct answer is: $(p \vee q) \rightarrow (p \rightarrow q)$ → No, $(p \vee r) \wedge (\neg p \vee q) \rightarrow (q \vee r)$ → Yes, $(p \wedge q) \rightarrow p$ → Yes

Let *p*, *q* be two propositions. Which propositions are logically equivalent to $\neg q \rightarrow \neg p$ **?**

The correct answer is: $\neg q \rightarrow p$ → No, $p \rightarrow q$ → Yes, $\neg p \vee q$ → Yes, $\neg p \rightarrow \neg q$ → No

Which statements are correct?

The correct answer is: $\forall x(P(x) \vee Q(x))$ and $\forall x P(x) \vee \forall x Q(x)$ have the same truth values → False, $\forall x(P(x) \wedge Q(x))$ and $\forall x P(x) \wedge \forall x Q(x)$ have the same truth values → True, $\forall x(P(x) \to Q(x))$ and $\forall x P(x) \to \forall x Q(x)$ have the same truth values → False

Translate the logical expression into sentence, domain is all real numbers

$\forall x \forall y((xy=0) \to ((x=0) \vee (y=0)))$

The correct answer is: If the product of two numbers is 0 then at least one of them is 0

Given the argument:

"*Students of class 1A must take either Discrete Math 1 or Advanced Math 2 this term. Discrete Math 1 is not on the schedule of this class. Therefore students of this class are taking Advanced Math 2.*"

Choose correct statement:

The correct answer is: This valid argument is based on disjunctive syllogism

Find the negation of
$\exists x \exists y(\forall z T(x,y,z) \vee Q(x,y))$ **?**

The correct answer is: $\forall x \forall y(\exists z \neg T(x,y,z) \wedge \neg Q(x,y))$

Which statements are FALSE? (A, B are sets)

The correct answer is: $A-(B-A)=A-B$

Let A={0, a}, B={0, b}. Find the cardinality of the set P(A x B).

The correct answer is: 16

Let f(X) = 5X + 4, g(X) = 4X + 3. Suppose that f o g (X) = aX + b. Find a - b.

The correct answer is: 1

Let f(X) = 5X + 4, g(X) = 4X + 3. Suppose that f o g (X) = aX + b. Find a + b.

The correct answer is: 39

Compute $\left\lfloor \frac{3}{2} - \left\lceil 3 + \frac{5}{4} \right\rceil \right\rfloor$

The correct answer is: -4

Let f: Z x Z --> Z, f(m, n) = n+1. Choose correct answer:

The correct answer is: f is onto but not one-to-one

Compute

$$\sum_{i=1}^{6} (2.3^i + 3.2^i).$$

The correct answer is: 2562

Which of the following propositions are negation of $p \leftrightarrow q$ **?**

The correct answer is: $\neg p \leftrightarrow \neg q$ → No, $\neg p \leftrightarrow q$ → Yes, $\neg q \leftrightarrow \neg p$ → No, $p \leftrightarrow \neg q$ → Yes

Given two propositions:

***p* = "I go to Hanoi"**

***q* = "I visit Sword Lake"**

Which sentence on the left corresponds to the expression of the right?

The correct answer is: I went to Hanoi, but I did not visit Sword Lake. → p ^ ¬q, Whenever I go to Hanoi, I visit Sword Lake. → p → q, I cannot visit Sword Lake if I do not go to Hanoi → ¬p → ¬q, I visit Sword Lake only if I go to Hanoi. → q → p

Let *p*, *q* be two propositions. Which propositions are logically equivalent to $p \to q$ **?**

The correct answer is: $p \vee q$ → No, $\neg p \wedge q$ → No, $\neg p \vee \neg q$ → No, $\neg p \vee q$ → Yes

Let *p*, *q* be two propositions. Which propositions are logically equivalent to $p \oplus q$ **?**

The correct answer is: $(p \vee q) \oplus (\neg p \vee \neg q)$ → No, $(p \vee q) \vee (\neg p \vee \neg q)$ → No, $(p \vee q) \wedge (\neg p \vee \neg q)$ → Yes

Which statements are correct?

The correct answer is: $\forall x(P(x) \to Q(x))$ and $\forall x P(x) \to \forall x Q(x)$ have the same truth values → False, $\forall x(P(x) \vee Q(x))$ and $\forall x P(x) \vee \forall x Q(x)$ have the same truth values → False, $\forall x(P(x) \wedge Q(x))$ and $\forall x P(x) \wedge \forall x Q(x)$ have the same truth values → True

Let

$P(x)$ = "x is a real number"

$Q(x)$ = "x is a rational number"

Match the proposition on the left with the sentence on the right.

The correct answer is: $\neg \exists x(\neg P(x) \wedge Q(x))$ → There does not exist a rational number that is not a real number, $\exists x(P(x) \wedge \neg Q(x))$ → There is a real number that is not rational, $\exists x(P(x) \wedge Q(x))$ → There is a number that is both real and rational, $\forall x(Q(x) \to P(x))$ → Any rational number is a real number

Given the hypotheses:

- **I work hard or I am smart**
- **I am not smart**
- **If I work hard then I will pass the exam**
- **If I am lucky then I will pass the exam**

Which statement can be deduced from the above hypotheses?

The correct answer is: I work hard and I pass the exam

Which propositions are true, where domain is the set of all integers?

The correct answer is: $\forall x \forall y((x^2 = y^2) \to (|x| = |y|))$ → Yes, $\forall x \exists y(xy = 3)$ → No, $\forall x \exists y(x - y^2 > 100)$ → No, $\forall x \exists y(x = y^{1/2})$ → No

Let U = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}. Represent the subset A = {1, 4, 5, 7, 9} by a bit string where the i-th bit is 1 if an d only if i is in A.

The correct answer is: 1001101010

Let A={0, a}, B={0, b}. Determine B x A.

The correct answer is: {(0,0), (b, a), (0, a), (b, 0)}

Let f(X) = 5X + 4, g(X) = 4X + 3. Suppose that gof (X) = aX + b. Find b.

The correct answer is: 19

Let f(X) = 5X + 4, g(X) = 4X + 3. Suppose that f o g (X) = aX + b. Find a + b.

The correct answer is: 39

Compute $\left\lfloor \frac{3}{2} - \left\lceil 3 + \frac{5}{4} \right\rceil \right\rfloor$

The correct answer is: -4

Let f: Z x Z --> Z, f(m, n) = n+1. Choose correct answer:

The correct answer is: f is onto but not one-to-one

Compute

$$\sum_{i=0}^{5} (2.3^i + 3.2^i).$$

The correct answer is: 917

Who is the tallest and who is the shortest?

- **If the tallest is not An then it must be Binh**
- **If Binh is not the shortest then Tam is the tallest**

The correct answer is: An is tallest, Binh is shortest

Given two propositions:

***p* = "I went to Paris."**

***q* = "I visit Eiffel Tower"**

Which sentence on the left corresponds to the expression on the right?

The correct answer is: I cannot visit Eiffel Tower if I do not go to Paris. → ¬p → ¬q, Whenever I go to Paris, I visit Eiffel Tower. → p → q, I visit Eiffel Tower only if I go to Paris. → q → p, I went to Paris, but I did not visit Eiffel Tower. → p ^ ¬q

Which proposition is logically equivalent to

$(p \to q) \vee [\neg p \to (q \vee r)]$ **?**

The correct answer is: T

Which propositions are logically equivalent to $p \leftrightarrow q$ **?**

The correct answer is: $\neg p \leftrightarrow \neg q$ → Yes, $\neg p \leftrightarrow q$ → No, $\neg q \leftrightarrow \neg p$ → Yes, $p \leftrightarrow \neg q$ → No

Let *P*(*x*) be a propositional function with domain {–1, 0, 1}

Which proposition on the left has the same truth value as the proposition on the right?

The correct answer is: $\forall x((x \neq 1) \to \neg P(x))$ → ¬ P(-1) ^ ¬ P(0), $\exists x((x \neq 1) \wedge P(x))$ → P(-1) v P(0), $\exists x \neg P(x)$ → ¬P(-1) v ¬P(0) v ¬P(1)

Let

P(x) = "x goes to class regularly"

Q(x) = "x reads books"

R(x) = "x passed the exam"

Translate the sentence into logical expression, domain is the set of all students in class.

"Some student who goes to class regularly and reads books has failed the exam"

The correct answer is: $\exists x(P(x) \wedge Q(x) \wedge \neg R(x))$

Given the argument:

"If I wake up early I will review yesterday's lecture. If I review yesterday's lecture I will do good on the test. Therefore, if I do good on the test that means I woke up early."

Choose correct statement:

The correct answer is: This argument is a fallacy

Find the negation of
$\exists y(Q(x,y) \wedge \forall x \neg R(x,y))$

The correct answer is: $\forall y(\neg Q(x,y) \vee \exists x R(x,y))$.

Can we conclude that A=B if the sets A, B, C satisfy

The correct answer is: $A \cup C = B \cup C$ → No, $A - C = B - C$ → No, $A \cap C = B \cap C$ và A, B đều là các tập con của C → Yes

Let A={0, a}, B={0, b}. Determine A x B.

The correct answer is: {(0,0), (0, b), (a, 0), (a, b)}

Compute $\lfloor \left(\frac{7}{2}\right)^2 \rfloor - \left(\lfloor \frac{7}{2} \rfloor\right)^2$

The correct answer is: 3

Let f(X) = 5X + 4, g(X) = 4X + 3. Suppose that f o g (X) = aX + b. Find a + b.

The correct answer is: 39

Compute $\lfloor \frac{3}{2} - \lceil 3 + \frac{5}{4} \rceil \rfloor$

The correct answer is: -4

Let f: Z x Z --> Z, f(m, n) = n+1. Choose correct answer:

The correct answer is: f is onto but not one-to-one

Given the sequence 1, 2, 2, 3, 3, 3, 4, 4, 4, 4,...

Find the 100th term.

The correct answer is: 14

Which compound proposition is True when *p*=*r*= True and *q* = False, and is False otherwise?

The correct answer is: $p \wedge \neg q \wedge r$

Given two propositions:

***p* = "I visit Hanoi."**

***q* = "I visit Ho Chi Minh mausoleum"**

Which sentence on the left corresponds to the expression on the right?

The correct answer is: I went to Hanoi, but I did not visit Ho Chi Minh mausoleum. → p ^ ¬q, I visit Ho Chi Minh mausoleum only if I go to Hanoi. → q → p, I cannot visit Ho Chi Minh mausoleum if I do not go to Hanoi → ¬p → ¬q, Whenever I go to Hanoi, I visit Ho Chi Minh mausoleum. → p → q

Which propositions are logically equivalent to $p \leftrightarrow q$?

The correct answer is: $p \leftrightarrow \neg q$ → No, $\neg p \leftrightarrow \neg q$ → Yes, $\neg p \leftrightarrow q$ → No, $\neg q \leftrightarrow \neg p$ → Yes

Let *p*, *q* be two propositions. Which propositions are logically equivalent to $\neg p \oplus q$?

The correct answer is: $(\neg p \vee q) \wedge (p \vee \neg q)$ → Yes, $(\neg p \vee q) \vee (p \vee \neg q)$ → No, $(\neg p \vee q) \oplus (p \vee \neg q)$ → No

Let *P*(*x*) be a propositional function with domain {–1, 0, 1}

Which proposition on the left has the same truth value as the proposition on the right?

The correct answer is: $\exists x P(x) \wedge \forall x ((x \neq 0) \rightarrow \neg P(x))$ → ¬P(-1)^P(0)^¬P(1), $\forall x P(x)$ → P(-1)^P(0)^P(1), $\forall x ((x \neq 0) \rightarrow P(x)) \wedge \exists x \neg P(x)$ → P(-1)^¬P(0)^P(1)

Let

P(x) = "x goes to class regularly"

Q(x) = "x reads books"

R(x) = "x passed the exam"

Translate the sentence into logical expression, domain is the set of all students in class.

"Any student who goes to class regularly or reads books passed the exam"

The correct answer is: $\forall x((P(x) \vee Q(x)) \rightarrow R(x))$

Given the hypotheses:

- **I work hard or I am smart**
- **I am not smart**
- **If I work hard I will pass the exam**
- **If I am not lucky then I will not pass the exam.**

Which conclusion can be drawn?

The correct answer is: I work hard and I passed the exam and I am lucky

Find the negation of
$\exists x \forall y(\exists z T(x,y,z) \wedge \neg Q(x,y))$

The correct answer is: $\forall x \exists y(\forall z \neg T(x,y,z) \vee Q(x,y))$.

Let A, B be sets. Which statements do NOT imply that A = B?

The correct answer is: $A \cap B = \emptyset$

Find the cardinality of the set $P(\{\emptyset, a, \{a, \{a\}\}\})$

The correct answer is: 8

Compute $\lceil \left(\frac{7}{2}\right)^2 \rceil - \left(\lceil \frac{7}{2} \rceil\right)^2$

The correct answer is: -3

Let f(X) = 5X + 4, g(X) = 4X + 3. Suppose that f o g (X) = aX + b. Find a + b.

The correct answer is: 39

Compute $\lfloor \frac{3}{2} - \lceil 3 + \frac{5}{4} \rceil \rfloor$

The correct answer is: -4

Let f: Z x Z --> Z, f(m, n) = n+1. Choose correct answer:

The correct answer is: f is onto but not one-to-one

Compute

$$\sum_{i=0}^{10}(2^{i+1}-2^{i}).$$ The correct answer is: 2047

$$(\neg 1010111 \wedge 1100111) \oplus 1110111$$

The correct answer is: 1010111

Let p, *q* and *r* be propositions:

***p* = "You go to class regularly"**

***q* = "You do all homework problems"**

***r* = "You receive good grades"**

Translate the sentence into logical expression:

"You go to class regularly and do all homework problems but your grades are still not good."

The correct answer is: $p \wedge q \wedge \neg r$

Let *p*, *q* be two propositions. Which propositions are logically equivalent to $\neg q \to \neg p$?

The correct answer is: $\neg p \to \neg q$ → No, $\neg p \vee q$ → Yes, $\neg q \to p$ → No, $p \to q$ → Yes

Let *p*, *q* be two propositions. Which propositions are logically equivalent to $p \leftrightarrow q$?

The correct answer is: $(p \vee q) \wedge (\neg p \vee \neg q)$ → No, $(p \vee q) \oplus (\neg p \vee \neg q)$ → Yes, $(p \wedge q) \vee (\neg p \vee \neg q)$ → No

Which statements are correct?

The correct answer is: $\forall x(P(x) \wedge Q(x))$ and $\forall x P(x) \wedge \forall x Q(x)$ have the same truth values → True, $\forall x(P(x) \vee Q(x))$ and $\forall x P(x) \vee \forall x Q(x)$ have the same truth values → False, $\forall x(P(x) \to Q(x))$ and $\forall x P(x) \to \forall x Q(x)$ have the same truth values → False

Let:

P(x) = "x is 20 minutes late in the final exam"
Q(x) = "x is absent for more than 20% of lectures"
R(x) = "x is not eligible to take the final exam"

Translate the sentence into logical expression, domain is the set of all students in class

"Students who are not eligible to take final exams are those who is absent for more than 20% of lectures or is 20 minutes late in the final exam"

The correct answer is: $\forall x(R(x) \leftrightarrow (Q(x) \vee P(x)))$

Given an argument:

"If Jack is a soccer player then Jack is rich. Jack only plays pingpong. Therefore Jack is not rich."

Choose correct statement:

The correct answer is: This argument is a fallacy

Find the negation of
$\forall x \forall y(\exists z \neg T(x,y,z) \wedge Q(x,y))$

The correct answer is: $\exists x \exists y(\forall z T(x,y,z) \vee \neg Q(x,y))$.

Determine if each statement is true of false.

The correct answer is: $A \cup \text{Œ} = \text{Œ}$ → False, $A - \text{Œ} = \text{Œ}$ → False, $\text{Œ} - A = \text{Œ}$ → True, $A \cap A = A$ → True

Which statement is FALSE?

The correct answer is: $\{a,b\} \subseteq \{a,\{a,b\}\}$

Compute $\left\lfloor \frac{3}{2} - \left\lceil 3 + \frac{4}{5} \right\rceil \right\rfloor$

The correct answer is: -3

Let f(X) = 5X + 4, g(X) = 4X + 3. Suppose that f o g (X) = aX + b. Find a + b.

The correct answer is: 39

Compute $\left\lfloor \frac{3}{2} - \left\lceil 3 + \frac{5}{4} \right\rceil \right\rfloor$

The correct answer is: -4

Let f: Z x Z --> Z, f(m, n) = n+1. Choose correct answer:

The correct answer is: f is onto but not one-to-one

Compute

$$\sum_{i=20}^{30} i^2.$$

The correct answer is: 6985

Which logical connectives are used?

The correct answer is: Hồ Xuân Hương was born on 1/3 or 3/1. → Exclusive or, In Vietnam you can make deposit using VND or USD. → Disjunctive, No beer in this restaurant. → Negation, The first prize is 3 day tour of Singapore and 20 millions VND in cash. → Conjunction

Let *p*, *q* be propositions:

p = "You do all homework problems"

***q* = "You receive good grades"**

Translate the sentence into logical expression:

"Doing all homework problems is enough to receive good grades".

The correct answer is: $p \rightarrow q$

Let *p*, *q* be two propositions. Which propositions are logically equivalent to $p \rightarrow q$?

The correct answer is: $\neg p \vee \neg q$ → No, $p \vee q$ → No, $\neg p \vee q$ → Yes, $\neg p \wedge q$ → No

Let *p*, *q* be two propositions. Which propositions are logically equivalent to $p \oplus q$?

The correct answer is: $(p \vee q) \wedge (\neg p \vee \neg q)$ → Yes, $(p \vee q) \oplus (\neg p \vee \neg q)$ → No, $(p \vee q) \vee (\neg p \vee \neg q)$ → No

Let *P*(*x*) be a propositional function with domain {–1, 0, 1}

Which proposition on the left has the same truth value as the proposition on the right?

The correct answer is: $\exists x \neg P(x)$ → ¬P(-1) v ¬P(0) v ¬P(1), $\exists x((x \neq 1) \wedge P(x))$ → P(-1) v P(0), $\forall x((x \neq 1) \rightarrow \neg P(x))$ → ¬ P(-1) ^ ¬ P(0)

Let E(x, y) = "x emails y".

Translate the sentence into logical expression, domain is all people.

"Some one received an email from another person"

The correct answer is: $\exists x \exists y((x \neq y) \wedge E(x,y))$

Recall two fallacies:

(I) $[(p \rightarrow q) \wedge q] \rightarrow p$

(II) $[(p \rightarrow q) \wedge \neg p] \rightarrow \neg q$

Given the statement:

"In a right triangle, the sum of three angles is 180⁰. Let ABC be any triangle. The sum of three angles of ABC is 180⁰, therefore ABC is right triangle"

Choose correct statement:

The correct answer is: This is a fallacy of type (I)

Which pairs of propositions are logically equivalent?

The correct answer is: $\forall x \exists y P(x,y)$ và $\exists x \forall y P(x,y)$ → No, $\forall x P(x,y)$ và $\forall y P(x,y)$ → No, $\forall x \forall y P(x,y)$ và $\forall y \forall x P(x,y)$ → Yes, $\exists y P(x,y)$ và $\exists x P(x,y)$ → No

Let A, B be sets. The statement

$$A \cap (B \cup \overline{A}) = A \cap B$$

is True or False?

The correct answer is 'True'.

Which set has the maximum cardinality, where x is an integer.

The correct answer is: $\{x | x^2 < 100\}$

Which rules are functions from R to R?

The correct answer is: $f(x)=1/x$ → No, $f(x)=\ln(x)$ → No, $f(x)=\sqrt{x}$ → No, $f(x)=2x^2+1$ → Yes

Let f(X) = 5X + 4, g(X) = 4X + 3. Suppose that f o g (X) = aX + b. Find a + b.

The correct answer is: 39

Compute $\lfloor \frac{3}{2} - \lceil 3 + \frac{5}{4} \rceil \rfloor$

The correct answer is: -4

Let f: Z x Z --> Z, f(m, n) = n+1. Choose correct answer:

The correct answer is: f is onto but not one-to-one

Compute $\sum_{j=0}^{3} \sum_{i=0}^{2} (i+j)$

The correct answer is: 30

Find

$$(101001 \wedge 110011) \oplus 011011$$

The correct answer is: 111010

Given two propositions:

***p* = "I went to Paris."**

***q* = "I visit Eiffel Tower"**

Which sentence on the left corresponds to the expression on the right?

The correct answer is: I cannot visit Eiffel Tower if I do not go to Paris. → ¬p → ¬q, Whenever I go to Paris, I visit Eiffel Tower. → p → q, I went to Paris, but I did not visit Eiffel Tower. → p ^ ¬q, I visit Eiffel Tower only if I go to Paris. → q → p

Translate the logical expression into sentence, domain is all real numbers

$$\forall x \forall y (((x<0) \wedge (y<0)) \rightarrow (xy>0))$$

The correct answer is: The product of two negative numbers is positive

Recall two fallacies:

(I) $[(p \to q) \wedge q] \to p$

(II) $[(p \to q) \wedge \neg p] \to \neg q$

Given the statement:

"In a right triangle, the sum of three angles is 180^0. Therefore, the sum of three angles of an acute triangle is not 180^0."

Choose correct statement:

The correct answer is: This is a fallacy of type (II)

Let A, B be sets. The statement

$$(A \cup B) \cap (\overline{A} \cup \overline{B}) = \emptyset$$

is True of False?

The correct answer is 'False'.

Determine if each statement is true or false.

The correct answer is: The cardinality of the empty set is 0. → True, x is an element of the set {x}. → True, The empty set $\emptyset$ is a subset of any set. → True, 0 is an element of the empty set $\emptyset$. → False

Compute

$$\sum_{i=1}^{11} (1 + (-1)^i).$$

The correct answer is: 10

Find

$$(01010 \vee 10001) \oplus 01000$$

The correct answer is: 10011

Let *p*, *q* be two propositions. Which propositions are logically equivalent to $p \to q$?

The correct answer is: $\neg q \to p$ → No, $\neg p \to \neg q$ → No, $\neg q \to \neg p$ → Yes, $\neg p \to q$ → No

Given an argument:

"If Jack is a soccer player then Jack is rich. Jack is a soccer player. Therefore Jack is rich."

Choose correct statement:

The correct answer is: This valid argument is based on modus ponens

Which statements are FALSE? (A, B are sets)

The correct answer is: $A-B=B-A$

Find the cardinality of the set { 1, 2, 3, 2, 5, 6 }

The correct answer is: 5

Compute

$$\sum_{i=0}^{10}\left(1+(-1)^i\right).$$

The correct answer is: 1202

Find

$$(\neg 101011 \wedge 110011) \oplus 111011$$

The correct answer is: 101011

Let *p*, *q* be two propositions. Which propositions are logically equivalent to $p \rightarrow q$?

The correct answer is: $p \vee q$ → No, $\neg p \vee q$ → Yes, $\neg p \wedge q$ → No, $\neg p \vee \neg q$ → No

Given the hypotheses:

- **Every FPT students stays in the dorm.**
- **An is staying in the dorm.**
- **Bình is not staying in the dorm.**

Which conclusion can be drawn?

The correct answer is: Bình is not a student of FPT

Let A ={1, 2, 4, 6, 7, 9, 8} B = {3, 1, 5, 7, 6}. Which set has the maximum cardinality?

The correct answer is: $A-B$

Let $A \times B = Œ$. Choose the best answer.

The correct answer is: Either A or B is empty set

Given the sequence 1, 2, 2, 3, 3, 3, 4, 4, 4, 4, ...

Find the 200th term.

The correct answer is: 20

Let *p*, *q* be two propositions. Which propositions are logically equivalent to $\neg q \rightarrow \neg p$?

The correct answer is: $p \rightarrow q$ → Yes, $\neg p \rightarrow \neg q$ → No, $\neg p \vee q$ → Yes, $\neg q \rightarrow p$ → No

Let *p*, *q* be two propositions. Which propositions are logically equivalent to $p \rightarrow q$?

The correct answer is: $\neg q \rightarrow \neg p$ → Yes, $\neg p \rightarrow q$ → No, $\neg p \rightarrow \neg q$ → No, $\neg q \rightarrow p$ → No

Compute $\left\lceil \left(\frac{7}{2}\right)^2 \right\rceil - \left(\left\lceil \frac{7}{2} \right\rceil\right)^2$

The correct answer is: -3

Find:

$(01010 \oplus 10101) \oplus 01000$

The correct answer is: 10111