

CS/MATH 111, Discrete Structures - Fall 2018.

Discussion 1 - Review

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Outline

Logic

Counting

Equations

Quadratic Equations

Cubic Equations

Logic

For sentences (a) and (b), tell which of the sentences (i)-(v) is **equivalent** to it.

(a) **“If X is green or pink, then X is a vegetable.”**

- (i) “X is green and X is a vegetable.”
- (ii) “X is not green and X is not a vegetable.”
- (iii) “X is not green or X is a vegetable.”
- (iv) “X is not green and X is a vegetable.”
- (v) None of the above.

Logic

For sentences (a) and (b), tell which of the sentences (i)-(v) is **equivalent** to it.

(a) **“If X is green or pink, then X is a vegetable.”**

- (i) “X is green and X is a vegetable.”
- (ii) “X is not green and X is not a vegetable.”
- (iii) “X is not green or X is a vegetable.”
- (iv) “X is not green and X is a vegetable.”
- (v) **None of the above.**

Logic

For sentences (a) and (b), tell which of the sentences (i)-(v) is **equivalent** to it.

(b) **“X is a pig, and Y or Z is a bird.”**

- (i) “Either X is not a pig, or Y and Z are not birds.”
- (ii) “Either X is a pig and Y is a bird, or X is a pig and Z is a bird.”
- (iii) “X is not a pig, and neither Y nor Z is a bird.”
- (iv) “X is a pig, and both Y and Z are birds.”
- (v) None of the above.

Logic

For sentences (a) and (b), tell which of the sentences (i)-(v) is **equivalent** to it.

(b) **“X is a pig, and Y or Z is a bird.”**

- (i) “Either X is not a pig, or Y and Z are not birds.”
- (ii) **“Either X is a pig and Y is a bird, or X is a pig and Z is a bird.”**
- (iii) “X is not a pig, and neither Y nor Z is a bird.”
- (iv) “X is a pig, and both Y and Z are birds.”
- (v) None of the above.

Logic

For sentences (c), (d), and (e), tell which of the sentences (i)-(v) is its **negation**.

(c) " $\forall x \exists y : y < x^2 + 17$ "

- (i) " $\forall x \exists y : y \geq x^2 + 17$ "
- (ii) " $\forall y \exists x : x^2 + 17 < y$ "
- (iii) " $\exists x \exists y : y > x^2 + 17$ "
- (iv) " $\exists x \forall y : y \geq x^2 + 17$ "
- (v) None of the above.

Logic

For sentences (c), (d), and (e), tell which of the sentences (i)-(v) is its **negation**.

(c) “ $\forall x \exists y : y < x^2 + 17$ ”

- (i) “ $\forall x \exists y : y \geq x^2 + 17$ ”
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- (iii) “ $\exists x \exists y : y > x^2 + 17$ ”
- (iv) “ $\exists x \forall y : y \geq x^2 + 17$ ”
- (v) None of the above.

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Cubic Equations

Counting

- ▶ Anything that could move (or could be moved), will be tracked...
 - ▶ Sensors, Sensors everywhere...
 - ▶ Smart phones, GPS, RFID, WiFi, Bluetooth, ZigBee, IoT, Satellites, Drones, Surveillance cameras...

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