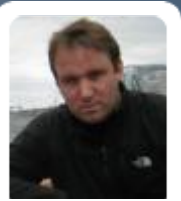# Computing

Tutor : Kevin O'Brien

Tutorial: Maths for Computing

Online Tutorial : Number Two:

- Session Three: Logic
    - Propositions, Symbolic Statements and Truth Tables
    - Conditional Connectives
    - Laws of Logic
    - Logic Gates

- Session Four : Functions
    - What Is A Functions
    - Functions with Special Properties
    - Exponential and Logarithmic Functions
    - Comparing the Size of Functions
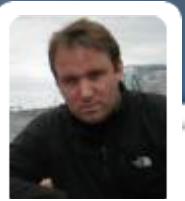
Logic: Symbolic Statements and Truth Tables

Propositions

- Tautologies and Contradictions
- Negation of a proposition
- Compound statements
- Truth Tables

# Logic: Symbolic Statements and Truth Tables

(2008 Q3a)

Let p and q be the following propositions about an object

p: " this objects is a triangle"

q: " this object is blue"

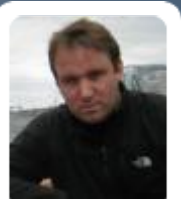Express each of the following compound propositions symbolically by using p, q and appropriate logic symbols

1) This object is a blue triangle

2) If this object is blue, then it is a triangle

3) This object is not blue, but it is a triangle.
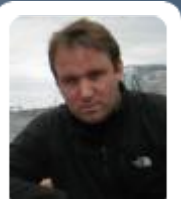
Logic: The Conditional Connectives

The Conditional Connectives

- The Conditional Connectives are
  - If
  - Only If
  - If and Only If
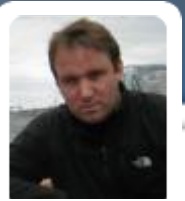- Truth Tables
- The Contrapositive

Logic: The Laws of Logic

The Laws of Logic

- The Commutative Laws
- The Associative Laws
- Distributive Laws
- De Morgan's Laws
- Identity Laws
- Asborption and Complement Laws

Logic: The Laws of Logic

(2012 Zone B Question 2 c) Use Truth Tables to prove that

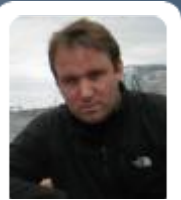|							

Logic: Logic Gates

(2008 Q3b)

Construct a logic network that accepts as inputs p and q, which may independently have value 0 or 1, and give as final output (FINISH)
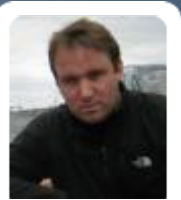
Logic: Logic Gates

- – Designing Logic Gates
- – Output of a given Network

Functions: What is a Function

Functions

- Introduction and Definitions
- Arrow Diagram of a Function
- Boolean Functions and ordered n-tuples
- Absolute Value Functions
- Floor and Ceiling Functions
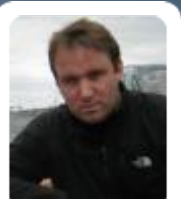- Polynomial Functions
- Equality of Functions

Functions: What is a Function

Arrow Diagrams (2010 Zone B Q4 a)

A function f: X->Y, where X = {p,q,r,s} and Y={1,2,3,4,5} is given by the subset of X x Y. {(q,3),(r,3),(p,5),(s,2)}

i. Show f as an arrow diagram

Functions: What is a Function

Arrow Diagrams (2010 Zone B Q4 a)

A function f: X->Y, where X = {p,q,r,s} and Y={1,2,3,4,5} is given by the subset of X x Y. {(q,3),(r,3),(p,5),(s,2)}

ii. State the domain, co-domain and range of f.

Functions: What is a Function
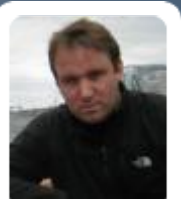
Arrow Diagrams (2010 Zone B Q4 a)

A function f: X->Y, where X = {p,q,r,s} and Y={1,2,3,4,5} is given by the subset of X x Y. {(q,3),(r,3),(p,5),(s,2)}

iii. Say why f does not have the one-to-one property and why f does not have the onto property, giving a specific counter example in each case.

Functions: What is a Function
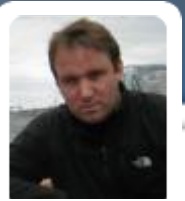
Functions

- – Introduction and Definitions
- – Arrow Diagram of a Function
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- – Polynomial Functions
- – Equality of Functions
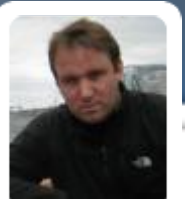
Functions: Floor and Ceiling Functions

Page 67 Q5: Find the floor and ceiling of the following numbers.

Number	Floor	Ceiling
-1.4		
2.3		
7/9		
-16/3		
0		

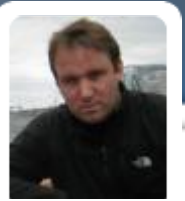# Functions: Functions with Special Properties

Functions

– Encoding and Decoding Function

– Onto Functions

– One-to-One Functions

– Inverse Functions

– One to One Correspondence

Functions: Functions with Special Properties

Inverse of Functions (2010 Zone B Question 4).

State the condition to be satisfied in order for an function to have an inverse.

Functions: Exponential and Logarithmic Functions

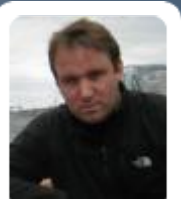Exponential and Logarithmic Functions

– Exponential Functions

– Laws of Exponents

– Logarithmic Functions

– Laws of Logarithms

Functions: Exponential and Logarithmic Functions

(Page 67 Q 10) Without using your calculator, find the value of the following numbers.

Number	Workings 1	Workings 2	Answers
Log $_2$128			
$\log_2(42)$			
$\log_2(1/8)$			
$\log_2(2/16)$			

Functions: Comparing Functions

Comparing Functions

- O-notation
- Power Functions
- Orders of Polynomial Functions
- Comparison of Algorithms