Philadelphia University
Department of Basic Sciences and Mathematics

Academic Year:	2017–2018	**Course Name:**	Mathematica
Semester:	Second Semester	**Course Number:**	250372
Exam:	First Exam	**Instructor:**	Feras Awad
Exam Date:	27/03/2018	**Student Name:**	_____
Exam Day:	Wednesday	**University ID:**	_____
Mark:	[20]	**Section:**	_____

Question ONE : (16 points) Write the symbol of the correct answer in the blank.

1. [ ] The **exact value** of $\cos^2\left(\sin^{-1}\frac{2}{5}\right)$ is

(A) $\frac{21}{25}$ (B) $\frac{\sqrt{21}}{5}$ (C) $\frac{3}{5}$ (D) $\frac{4}{5}$

2. [ ] Which of the following is a **prime** number ?

(A) 3515661146457 (B) 54657867321
(C) 987156215753 (D) 252097800623

3. [ ] Add **parentheses** to the expression 4 + 7 * 3 − 5 / 2 + 9 to make 19.

(A) (4 + 7) * 3 − 5 / 2 + 9 (B) (4 + 7 * 3 − 5) / (2 + 9)
(C) (4 + 7) * (3 − 5) / 2 + 9 (D) (4 + 7 * 3 − 5) / 2 + 9

4. [ ] The **numerical value** of $\frac{2^{\log_3(18)}+\csc(32^\circ)}{5!-\sqrt[8]{24}}$ is

(A) 0.0667379 (B) 0.0681898 (C) 0.0665197 (D) 0.0262455

5. [ ] The value of $\frac{1}{2}+\frac{2}{3}+\frac{3}{4}+\cdots+\frac{98}{99}+\frac{99}{100}$ in 9−digits is

(A) 0.98019802 (B) 94.8126225 (C) 104.177378 (D) 1.02020202

Time: 60 Minutes **[1]** **11:15 - 12:15**

6. [ ] Which of the following statements is **TRUE** ?

(A) $\forall x \in \mathbb{R}$ and $x < 10$, $x^3 - 3x < 3$
(B) $\exists x \in \mathbb{Z}$ such that $\forall y \in \mathbb{Z}$, $x^2 + y^3 = 1000$
(C) $\exists x \in \mathbb{R}$ such that $\forall y \in \mathbb{R}$, $x^2 \leq y$
(D) $\forall x \in \mathbb{Z}$, $\exists y \in \mathbb{R}$, such that $x^2 + y^3 = 1000$

7. [ ] Which of the following statements is a **tautology** ?

(A) $(p \wedge q) \Leftrightarrow (\sim p \wedge \sim q)$
(B) $\sim (p \vee q) \Rightarrow (p \wedge \sim q)$
(C) $(\sim p \vee \sim q) \Leftrightarrow \sim (p \wedge q)$
(D) $\sim (p \vee q) \Leftrightarrow p \wedge \sim q$

8. [ ] Let $A = \{5, -2, 8, 4, 3, 7\}$ and $B = \{2, -1, 3, 7\}$, then the number of elements in the power set of $A \cup B$ equals

(A) 256 (B) 1024 (C) 80 (D) 64

Question TWO : (4 points) Write the truth table of the statement

$$(\sim p \Rightarrow q) \Leftrightarrow (p \wedge q)$$

p	q	$(\sim p \Rightarrow q) \Leftrightarrow (p \wedge q)$