Student Study Plan

https://t.me/sm015sdl

Week /Date	Lecture	Semak	Tutorial	Semak	Self Directed Learning	Semak	Revision	Semak
1 27/5/18 – 2/6/18	**1.0 Number System** 1.1 Real Numbers (a) Define natural numbers (N), whole numbers (W), integer (Z), prime number, rational numbers (Q) and irrational numbers ($\bar{Q}$). (b) Represent rational and irrational number in decimal form. (c) Represent the relationship of number sets in areal number system diagrammatically showing $N \subset W \subset Z \subset Q$ and $Q \cup \bar{Q} = R$. (d) Represent open, closed and half-open intervals and their representations on the number line. (e) Find union, $\cup$, and intersection, $\cap$, of two or more intervals with the aid of number line. 1.2 Complex Numbers (a) Represent the complex number in Cartesian form. (b) Define the equality of two Complex Numbers.	☐	**1.0 Number System** 1.2 Complex Numbers (c) Show the conjugate of a Complex Number $(\bar{z})$.	☐	**SDL 1.1**	☐		
			1.0 Number System 1.2 Complex Numbers (d) Determine a Complex Number in polar form $z = r(\cos\theta + i\sin\theta)$ where $r > 0$ and $-\pi < \theta \leq \pi$.		**SDL 1.2**	☐		
	1.0 Number System 1.3 Indices, Surds and Logarithms (a) Express the rules of indices. (b) Explain the meaning of a surd and its conjugate. (c) Perform algebraic operations on surds.		**1.0 Number System** 1.2 Complex Numbers (d) Determine a Complex Number in polar form $z = r(\cos\theta + i\sin\theta)$ where $r > 0$ and $-\pi < \theta \leq \pi$.		**SDL 1.3**	☐		
2 3/6/18 – 9/6/18	**1.0 Number System** 1.3 Indices, Surds and Logarithms (d) Express the law of logarithms such as: i. $\log_a MN = \log_a M + \log_a N$ ii. $\log_a \frac{M}{N} = \log_a M - \log_a N$ iii. $\log_a M^N = N\log_a M$. (e) Change the base of logarithm using $\log_a M = \frac{\log_b M}{\log_b a}$.	☐	**1.0 Number System** 1.2 Complex Numbers (d) Determine a Complex Number in polar form $z = r(\cos\theta + i\sin\theta)$ where $r > 0$ and $-\pi < \theta \leq \pi$. **2.0 Equations, Inequalities and Absolute Values** 2.3 Absolute Values (b) Solve absolute equations of these forms: i. $\lvert ax+b \rvert = cx+d$ ii. $\lvert ax+b \rvert = \lvert cx+d \rvert$ and iii. $\lvert ax^2+bx+c \rvert = d$	☐	**SDL 2.1**	☐		
	2.0 Equations, Inequalities and Absolute Values 2.1 Equations (a) Find the equations involving surds, indices and logarithms.		**1.0 Number System** 1.2 Complex Numbers (d) Determine a Complex Number in polar form $z = r(\cos\theta + i\sin\theta)$ where $r > 0$ and $-\pi < \theta \leq \pi$. **2.0 Equations, Inequalities and Absolute Values** 2.3 Absolute Values (b) Solve absolute equations of these forms: i. $\lvert ax+b \rvert = cx+d$ ii. $\lvert ax+b \rvert = \lvert cx+d \rvert$ and iii. $\lvert ax^2+bx+c \rvert = d$					
3 10/6/18 – 16/6/18	**2.0 Equations, Inequalities and Absolute Values** 2.2 Inequalities (a) Relate the properties of inequalities. (b) Find the linear inequalities. (c) Find the quadratic inequalities by algebraic or graphical approach.	☐	**2.0 Equations, Inequalities and Absolute Values** 2.3 Absolute Values (c) Solve absolute inequalities of the form as follows: i. $\lvert ax+b \rvert > cx+d$ ii. $\lvert ax+b \rvert > \lvert cx+d \rvert$	☐	**SDL 2.2**	☐		
	2.0 Equations, Inequalities and Absolute Values 2.2 Inequalities (d) Find the rational inequalities involving linear expressions.		**2.0 Equations, Inequalities and Absolute Values** 2.3 Absolute Values (c) Solve absolute inequalities of the form as follows: iii. $\left\lvert \frac{ax+b}{cx+d} \right\rvert > e$ and					
			2.0 Equations, Inequalities and Absolute Values 2.3 Absolute Values (c) Solve absolute inequalities of the form as follows: iv. $\lvert ax^2+bx+c \rvert > d$					
4 17/6/18 – 23/6/18	**2.0 Equations, Inequalities and Absolute Values** 2.3 Absolute Values (a) State the properties of absolute values as follows: i. $\lvert a \rvert \geq 0$ ii. $\lvert -a \rvert = \lvert a \rvert$ iii. $\lvert a+b \rvert = \lvert b+a \rvert$ iv. $\lvert a-b \rvert = \lvert b-a \rvert$ v. $\lvert ab \rvert = \lvert a \rvert \lvert b \rvert$ and vi. $\left\lvert \frac{a}{b} \right\rvert = \frac{\lvert a \rvert}{\lvert b \rvert}$ where $\lvert b \rvert \neq 0$.	☐	**3.0 Sequences and Series** 3.2 Binomial Expansion (c) Determine the general term in a binomial expansion $(a+b)^n$ where n is a positive integer.	☐	**SDL 2.3**	☐		
			3.0 Sequences and Series 3.2 Binomial Expansion (c) Determine the general term in a binomial expansion $(a+b)^n$ where n is a positive integer.					

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	3.0 Sequences and Series 3.1 Sequences and Series (a) Write *n*th term of simple sequences and series. (b) Find the *n*th term of arithmetic sequences and series, $T_n = a+(n-1)d$ and the used of sum formula, $S_n = \frac{n}{2}\left[2a+(n-1)d\right]$ or $S_n = \frac{n}{2}\left[a+l\right]$		**3.0 Sequences and Series** 3.2 Binomial Expansion (d) Determine the expansion of $(1+x)^n$ for $\lvert x\rvert<1$ where *n* is a rational number.					
5 **24/6/18** **–** **30/6/18**	**3.0 Sequences and Series** 3.1 Sequences and Series (c) Find the *n*th term of geometric sequences and series, $T_n = ar^{(n-1)}$ and the used of sum formula, $S_n = \frac{a(1-r^n)}{1-r}$ for $r \neq 1$. **3.0 Sequences and Series** 3.2 Binomial Expansion (a) Find the expansion of $(a+b)^n$ where *n* is a positive integer. (b) Write *n*! notations and ${}^nC_r = \binom{n}{r}$ as a binomial coefficient.	☐	**3.0 Sequences and Series** 3.2 Binomial Expansion (d) Determine the expansion of $(1+x)^n$ for $\lvert x\rvert<1$ where *n* is a rational number. **3.0 Sequences and Series** 3.2 Binomial Expansion (d) Determine the expansion of $(1+x)^n$ for $\lvert x\rvert<1$ where *n* is a rational number. **4.0 Matrices and System Of Linear Equations** 4.3 Inverse of a Matrix (up to 3x3) (a) Compute the inverse of a non-singular matrix using; i. Adjoint matrix.	☐	**SDL 3.1** **SDL 3.2**	☐ ☐	Revision Chapter 1 – Chapter 3	☐
6 **1/7/18** **–** **7/7/18**	**3.0 Sequences and Series** 3.2 Binomial Expansion (a) Find the expansion of $(a+b)^n$ where *n* is a positive integer. (b) Write *n*! notations and ${}^nC_r = \binom{n}{r}$ as a binomial coefficient. **4.0 Matrices and System Of Linear Equations** 4.1 Matrices (a) Identify the different type of matrices. (b) Perform operations on matrices.	☐	**4.0 Matrices and System Of Linear Equations** 4.3 Inverse of a Matrix (up to 3x3) (a) Compute the inverse of a non-singular matrix using; i. Adjoint matrix. **4.0 Matrices and System Of Linear Equations** 4.3 Inverse of a Matrix (up to 3x3) (a) Compute the inverse of a non-singular matrix using; i. Adjoint matrix. **4.0 Matrices and System Of Linear Equations** 4.3 Inverse of a Matrix (up to 3x3) (a) Compute the inverse of a non-singular matrix using; ii. Elementary row operations	☐	**SDL 4.1**	☐		
7 **8/7/18** **–** **14/7/18**	**4.0 Matrices and System Of Linear Equations** 4.1 Matrices (c) Find the transpose of a matrix. 4.2 Determinant of Matrices (a) Find the minors and cofactors of a matrix. **4.0 Matrices and System Of Linear Equations** 4.2 Determinant of Matrices (b) Find the determinant of a matrix.	☐	**4.0 Matrices and System Of Linear Equations** 4.3 Inverse of a Matrix (up to 3x3) (a) Compute the inverse of a non-singular matrix using; ii. Elementary row operations **4.0 Matrices and System Of Linear Equations** 4.4 System of Linear Equations with Three Variables (b) Solve the unique solution of $AX = B$ using: i. Inverse Matrix; ii. Elimination Method. **4.0 Matrices and System Of Linear Equations** 4.4 System of Linear Equations with Three Variables (b) Solve the unique solution of $AX = B$ using: i. Inverse Matrix; ii. Elimination Method.	☐	**SDL 4.2** **SDL 4.3**	☐ ☐		
8 **15/7/18** **–** **21/7/18**	**4.0 Matrices and System Of Linear Equations** 4.4 System of Linear Equations with Three Variables (a) Write a system of linear equations in the form $AX = B$. . **4.0 Matrices and System Of Linear Equations** 4.4 System of Linear Equations with Three Variables	☐	**4.0 Matrices and System Of Linear Equations** 4.4 System of Linear Equations with Three Variables (b) Solve the unique solution of $AX = B$ using: i. Inverse Matrix; ii. Elimination Method. **5.0 Functions and Graphs** 5.1 Functions. (d) Sketch the graph of a function.	☐	**SDL 4.4**	☐		

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	(a) Write a system of linear equations in the form $AX = B$		**5.0 Functions and Graphs** 5.3 Inverse Functions (a) Show whether a function has an inverse and find the inverse of the function. (b) Compute the inverse of a function. (d) Sketch the graph of the function f and its inverse f^{-1} on the same axes.					
9 **22/7/18** **–** **28/7/18**	**5.0 Functions and Graphs** 5.1 Functions (a) Define a function. (b) Identify a function from the graph by using vertical line test.	☐	**5.0 Functions and Graphs** 5.3 Inverse Functions (a) Show whether a function has an inverse and find the inverse of the function. (b) Compute the inverse of a function. (d) Sketch the graph of the function f and its inverse f^{-1} on the same axes.	☐	**SDL 5.1**	☐		
	5.0 Functions and Graphs 5.1 Functions (c) Identify a one-to-one function by using algebraic approach or horizontal line test. (e) State the domain and range of a function.		**5.0 Functions and Graphs** 5.4 Exponential and Logarithmic Functions (c) Find the composite functions involving the exponential and logarithmic functions.		**SDL 5.4**	☐		
10 **29/7/18** **–** **4/8/18**	**5.0 Functions and Graphs** 5.2 Composite Functions (a) Represent a composite function using an arrow diagram. (b) Find composite function. (c) Find one of the functions when the composite function and the other functions are given. .	☐	**5.0 Functions and Graphs** 5.4 Exponential and Logarithmic Functions (d) Sketch the graph which involve exponential and logarithmic functions on the same axes.	☐	**SDL 5.2**	☐	UPS SEMESTER 1	☐
	5.0 Functions and Graphs 5.3 Inverse Functions (c) Identify the domain and range of an inverse function		**5.0 Functions and Graphs** 5.4 Exponential and Logarithmic Functions (d) Sketch the graph which involve exponential and logarithmic functions on the same axes.		**SDL 5.3**	☐		
			6.0 Polynomials 6.3 Partial Fractions (a) Construct partial fractionss decomposition when the denominators in the form of; i. a linear factor, $ax+b$; ii. a repeated linear factor, $(ax+b)^n$;		**SDL 6.3**	☐		
11 **5/8/18** **–** **11/8/18**	**MID-TERM BREAK**							
12 **12/8 /18** **–** **18/8/18**	**5.0 Functions and Graphs** 5.4 Exponential and Logarithmic Functions (a) Find the relationship of exponential and logarithmic functions by algebraic and graphical approaches. (b) State the domain and range of an exponential and logarithmic functions.	☐	**6.0 Polynomials** 6.3 Partial Fractions (a) Construct partial fractionss decomposition when the denominators in the form of; iii. a quadratic factor, ax^2+bx+c that cannot be factorized	☐	**SDL 6.1**	☐		
	6.0 Polynomials 6.1 Polynomials (a) Perform addition, subtraction and multiplication of polynomials (b) Perform a division of polynomials.		**6.0 Polynomials** 6.3 Partial Fractions (b) Change the rational polynomials to proper fraction when the degree of the numerator is the same or more than the denominator and then determine the partial fractions.		**SDL 6.2**	☐		
13 **19/8/18** **–** **25/8/18**	**6.0 Polynomials** 6.2 Remainder Theorem, Factor Theorem and Zeroes of Polynomials. (a) Relate the remainder and factor theorems to solve problems.	☐	**7.0 Trigonometric Functions** 7.1 Trigonometric Ratios and Identities (c) Use some special angles. (e) Proof of the trigonometric identities.	☐	**SDL 7.1**	☐		
	6.0 Polynomials 6.2 Remainder Theorem, Factor Theorem and Zeroes of Polynomials. (b) Find the roots of the equations and the zeroes of a polynomial.		**7.0 Trigonometric Functions** 7.3 Solutions of Trigonometric Equations (a) Solve equations such as $\sin\theta = k$, $\cos\theta = k$ and $\tan\theta = k$.					

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			7.0 Trigonometric Functions 7.3 Solutions of Trigonometric Equations (b) Solve the equations in quadratic form.					
14 26/8/18 – 1/9/18	**7.0 Trigonometric Functions** 7.1 Trigonometric Ratios and Identities (a) State trigometric ratios of $\sin q$, $\cos q$, $\tan q$, $\text{cosec}\, q$, $\sec q$ and $\cot q$. (b) Express i. $\tan q = \frac{\sin q}{\cos q}$, ii. $\sin(90° - q) = \cos q$, iii. $\cos(90° - q) = \sin q$, iv. $\tan(90° - q) = \cos q$. (d) Find the angle of trigonometric equations. **7.0 Trigonometric Functions** 7.2 Compound Angles (a) Express the formulae $\sin(A \pm B)$, $\cos(A \pm B)$ and $\tan(A \pm B)$. (b) Express the double-angle formulae. (c) Express the half-angle formulae. (d) Express the factor formulae: $\sin A + \sin B = 2\sin\frac{A+B}{2}\cos\frac{A+B}{2}$; $\sin A - \sin B = 2\cos\frac{A+B}{2}\sin\frac{A+B}{2}$; $\cos A + \cos B = 2\cos\frac{A+B}{2}\cos\frac{A+B}{2}$; $\cos A - \cos B = -2\sin\frac{A+B}{2}\sin\frac{A+B}{2}$.	☐	**7.0 Trigonometric Functions** 7.3 Solutions of Trigonometric Equations (d) Solve $a\sin q \pm b\cos q = c$ where $t = \tan\frac{q}{2}$. **7.0 Trigonometric Functions** 7.3 Solutions of Trigonometric Equations (f) Solve $a\sin q \pm b\cos q = c$ using $R\sin(q \pm a)$ or $R\sin(q \mp a)$. **7.0 Trigonometric Functions** 7.3 Solutions of Trigonometric Equations (g) Determine the maximun and minimum values of trigonometric expressions in the form $a\sin q \pm b\cos q$.	☐	**SDL 7.2** **SDL 7.3**	☐ ☐		
15 2/9/18 – 8/9/18	**7.0 Trigonometric Functions** 7.3 Solutions of Trigonometric Equations (c) Express $\sin q$, $\cos q$ and $\tan q$ in term of t. (e) Express $a\sin q \pm b\cos q$ in the form of $R\sin(q \pm a)$ or $R\sin(q \mp a)$. **8.0 Limits and Continuity** 8.1 Limits (a) State limit of a function $f(x)$ as x approaches a given value a, $\lim_{x\to a} f(x) = L$. (b) State the basic properties of limit. (c) Find $\frac{\lim_{x\to a} f(x)}{\lim_{x\to a} g(x)}$ when $\lim_{x\to a} f(x) = 0$ and $\lim_{x\to a} g(x) = 0$ by the following methods: i. factorization; and ii. multiplication of conjugates. (d) Find one-sided limits in: i. $\lim_{x\to a^+} f(x) = L$; and ii. $\lim_{x\to a^-} f(x) = M$.	☐	**7.0 Trigonometric Functions** 7.3 Solutions of Trigonometric Equations (g) Determine the maximun and minimum values of trigonometric expressions in the form $a\sin q \pm b\cos q$. **8.0 Limits and Continuity** 8.1 Limits (e) Determine the existence of the limit of a function $\lim_{x\to a^-} f(x) = \lim_{x\to a^+} f(x)$. **8.0 Limits and Continuity** 8.2 Asymptotes (a) Find the vertical and horizontal asymptotes.	☐	**SDL 8.1** **SDL 8.2**	☐ ☐		
16 9/9/18 – 15/9/18	**8.0 Limits and Continuity** 8.1 Limits (f) Find the limits ; i. $\lim_{x\to a} f(x) = +\infty$; and ii. $\lim_{x\to a} f(x) = -\infty$. (g) Find limits at infinity; i. $\lim_{x\to +\infty} f(x) = L$; and ii. $\lim_{x\to -\infty} f(x) = M$. (h) Find $\lim_{x\to\infty} \frac{f(x)}{g(x)}$ when $\lim_{x\to\infty} f(x)$ and $\lim_{x\to\infty} g(x)$ are undefined. **8.0 Limits and Continuity** 8.1 Limits (i) Discuss the following limits: i. $\lim_{x\to +\infty}\left(\frac{1}{x^n}\right) = 0$; and ii. $\lim_{x\to -\infty}\left(\frac{1}{x^n}\right) = 0$ for $n > 0$.	☐	**8.0 Limits and Continuity** 8.2 Asymptotes (a) Find the vertical and horizontal asymptotes. **8.0 Limits and Continuity** 8.2 Asymptotes (a) Find the vertical and horizontal asymptotes. **8.0 Limits and Continuity** 8.3 Continuity (a) Explain the continuity of a function at a point. (b) Compute the continuity of a function at a point.	☐	**SDL 8.3**	☐	Rivision Chapter 1 – Chapter 8	☐
17 16/9/18 – 22/9/18	**9.0 Differentiation** 9.1 Derivative of a Function (a) Find the derivative of a function $f(x)$ using the first principle $\lim_{h\to 0}\frac{f(x+h) - f(x)}{h} = f'(x)$. (b) Discuss the differentiability of a function at $x = a$.	☐	**9.0 Differentiation** 9.2 Rules of Differentiation (a) Apply the rules of differentiation: i. Basic rule; ii. Sum rule; iii. Product rule; iv. Quotient rule; and v. Chain rule. **9.0 Differentiation**	☐	**SDL 9.1** **SDL 9.2**	☐		

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	9.0 Differentiation 9.2 Rules of Differentiation (b) Perform second and third order differentiation.		9.3 Differentiation of Exponential, Logarithmic and Trigometric Functions (b) Solve problems involving the combination of differentiation rules.			☐		
			9.0 Differentiation 9.4 Implicit Differentiations (a) Solve the first and the second derivatives implicitly.		**SDL 9.3**	☐		
18 **23/9/18** **–** **29/9/18**	**9.0 Differentiation** 9.3 Differentiation of Exponential, Logarithmic and Trigometric Functions (a) Find the derivatives of the functions: i. a^x, $a^{f(x)}$, e^x, $e^{f(x)}$; ii. $\ln x$, $\ln f(x)$; iii. $\sin x$, $\cos x$, $\tan x$, $\sec x$, $\operatorname{cosec} x$, $\cot x$;	☐	**9.0 Differentiation** 9.5 Parametric Differentiations (a) Solve the first and second parametric derivatives.	☐	**SDL 9.4**	☐		
	9.0 Differentiation 9.3 Differentiation of Exponential, Logarithmic and Trigometric Functions (a) Find the derivatives of the functions: iv. $\sin u$, $\cos u$, $\tan u$, $\sec u$, $\operatorname{cosec} u$ and $\cot u$; and v. $\sin^n x$, $\cos^n x$, $\tan^n x$, $\sec^n x$, $\operatorname{cosec}^n x$ and $\cot^n x$.		**9.0 Differentiation** 9.5 Parametric Differentiations (a) Solve the first and second parametric derivatives.		**SDL 9.5**	☐		
			10.0 Applications of Differentiation 10.1 Extremum Problems (d) Solve optimization problems.					
19 **30/9/18** **–** **6/10/18**	**10.0 Applications of Differentiation** 10.1 Extremum Problems (a) Find the critical points.	☐	**10.0 Applications of Differentiation** 10.2 Rate of Change (a) Solve problem regarding rate of change including related rates.	☐	**SDL 10.1**	☐	MODEL PSPM	☐
	10.0 Applications of Differentiation 10.1 Extremum Problems (b) Find the relative extremum using the first derivatives test. (c) Find the relative extremum using the second derivatives test.		**10.0 Applications of Differentiation** 10.2 Rate of Change (a) Solve problem regarding rate of change including related rates.		**SDL 10.2**	☐		
20 **7/10 /18** **–** **13/10/18**	**REVISION WEEK**							
21 **16/10 /18** **–** **23/10/18**	**FINAL EXAMINATION FOR SEM 1 (PSPM1)**							
22 **24/10 /18** **–** **10/11/18**	**FINAL SEMESTER HOLIDAY**							