UNIVERSITI KUALA LUMPUR
BUSINESS SCHOOL

FINAL EXAMINATION

OCTOBER 2025 SEMESTER

COURSE CODE	:	EAB10703
COURSE TITLE	:	MATHEMATICS FOR BUSINESS
PROGRAMME NAME	:	BACHELOR OF SCIENCE (HONS) IN ANALYTICAL ECONOMICS
DATE	:	27 JANUARY 2026
TIME	:	2:00PM - 5:00PM
DURATION	:	3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of ONE sections.
4. Section A consist of five questions. Answer FOUR (4) questions only.
5. Please write your answer on the answer booklet provided.
6. Please answer all questions in English only.
7. Refer to the attached Formula/ Appendies. ☑ *Tick if applicable*

THERE ARE 11 PAGES OF QUESTIONS INCLUDING THIS PAGE

SECTION A (Total: 100 marks)

Answer FOUR (4) questions.

Please use the answer booklet provided.

Question 1

Answer all of the following questions:

(a) Sketch the graph of the quadratic function $f(x)=x^2+2x-3$. Clearly label the intercepts and vertex.

(5 marks)

(b) In your opinion , how would an increase in demand affect the price.

(3 marks)

(c) Given matrices A and B as follows:

$$A = \begin{pmatrix} 4 & -1 & 3 \\ 2 & 5 & 0 \\ -2 & 1 & 6 \end{pmatrix}, B = \begin{pmatrix} 1 & 3 & -2 \\ 4 & -1 & 5 \\ 0 & 2 & 7 \end{pmatrix}$$

Find *2A-B*.

(5 marks)

(d) Seri Aman Enterprise received an invoice of RM5,000 dated 23 March 2024 for the purchase of 100 tables. The trade discount given was 14% and 10%, while the cash discounts terms 5/10, 3/25, n/40. Find

i. The single discount equivalent rate and the trade discount given.

(3 marks)

ii. The amount to be paid if the payment was made on 13 April 2024.

(3 marks)

(e) To settle the purchase of a house, Ahmad has to pay a down payment of RM10,000 plus RM2,000 at the end of the first month, RM1,900 at the end of the second month. RM1,800 at the end of the third month and so on for 20 months. What is the total payment?

(4 marks)

(f) Integrate:

$$\int \left(4x^3 + 5\right) dx$$

(2 marks)

Question 2

Answer all of the following questions:

(a) Find the roots of the quadratic equation x^2-7x+10=0 using factorization.

(2 marks)

(b) A company is producing a type of product with a selling price of RM100 per unit. To produce one unit of the product, the company has to use a raw material, at a cost of RM60. Fixed costs are RM8,000. If **q** represents the volume of products sold, determine:

i. Revenue function.

(1 marks)

ii. Cost function.

(1 marks)

iii. Quantity to be sold to obtain break-even point.

(3 marks)

(c) Solve the following system of equations using ANY matrix method:

$$\begin{pmatrix} 4x - 5y = 7 \\ 3x + 2y = 11 \end{pmatrix}.$$

(4 marks)

(d) Seri Aman Enterprise received an invoice of RM5,000 dated 23 March 2024 for the purchase of 100 tables. The trade discount given was 14% and 10%, while the cash discounts terms 5/10, 3/25, n/40.
Based on the invoice and discount terms, analyze the financial impact of paying on 15 April 2024. Suggest one strategy Seri Aman Enterprise could use to minimize payment and justify your suggestion.

(3 marks)

(e) Atiqah estimates that her monthly expenses will increase by 4% every month. If the expenses for the first month is RM50, determine:

i. The expenses for the 25^{th} month.

(3 marks)

ii. The total expenses for first year.

(2 marks)

(f) Evaluate the following integrals:

i. Given,

$$\int_0^2 \left(4x^3 - 6x + 5\right) dx$$

(4 marks)

ii. Given,

$$\int_2^5 (6 - x)\, dx$$

(2 marks)

Question 3

Answer all of the following questions:

(a) Find the point of intersection between the lines

$$y = 2x - 4 \text{ and } 3x + y = 5$$

(4 marks)

(b) Given the demand and supply function as follows:

$$Q_d = P^2 - 100P + 2500 \text{ and } Q_s = 0.5P^2 - 50$$

i. Determine the price at market equilibrium point of the price domain is

$$50 \leqslant P \leqslant 200$$

(4 marks)

ii. Determine the quantity for such price.

(2 marks)

(c) Let ***F*** and ***G*** be matrices given as follows: Compute **3*FG***.

$$F = \begin{pmatrix} -5 & 6 \\ -9 & 0 \end{pmatrix} \text{ and } G = \begin{pmatrix} 8 & -4 \\ 1 & -7 \end{pmatrix}$$

(4 marks)

(d) A shop sells a handbag at a marked price of RM200.

i. If the shop applies a 25% markup on the cost price, find the cost price.

(2 marks)

ii. During a promotion, the shop offers a 10% discount on the market price. Find the selling price after discount.

(2 marks)

(e) The sum of the first 7 terms of an arithmetic progression is 84, and the first term is 6. Find the common difference.

(4 marks)

(f) Find the second derivative d^2y/dx^2 of the following function:

$$y = \frac{5}{2}x^5 - x^4 + \frac{8}{6x^2} - 3x + 10$$

(3 marks)

Question 4

Answer all of the following questions:

(a) Factorize the following expressions:

i. $9x^2-100$.

(1 marks)

ii. x^2-16.

(1 marks)

(b) Solve the following quadratic equation $2x^2+9x+5=0$.

(4 marks)

(c) Given the arithmetic sequence 1, 5/4, 3/2, 7/4, 2, ... Find:

i. The 17th term.

(3 marks)

ii. What term is the number 18.

(2 marks)

(d) Mohd Adib loans RM5,000 to his cousin for 6 years at 4% compounded annually. Compute the future value and the total compound interest.

(4 marks)

(e) A manufacturer has a monthly fixed cost of RM623,000 and a production cost of RM12.50 for each unit produced. The product sells for RM13 per unit.

i. What is the cost function?

(1 marks)

ii. What is the revenue function?

(1 marks)

iii. What is the profit function?

(4 marks)

iv. If the manufacturer only sells 10,000 units, what is the profit / loss ?

(1 marks)

(f) Integrate:

$$\int (4 + 3\sqrt{x})dx$$

(3 marks)

Question 5

Answer all of the following questions:

(a) Write the equation of the line in slope-intercept form through the point (-2,4) and perpendicular to the line, 2x+y=-4.

(4 marks)

(b) Suppose the market for LEGO sets has a supply curve P=10+Q, and a demand curve of P=150-6Q. Assume that the market is perfectly competitive.

i. What will the equilibrium price and quantity of LEGO be?

(4 marks)

ii. If the price in the market is set at 50, will there be a surplus or a shortage? Explain your answer.

(3 marks)

(c) Given matrix

$$A = \begin{pmatrix} 4 & 1 & 5 \\ 0 & 2 & 3 \\ 2 & -1 & 6 \end{pmatrix}$$

i. Find all the minors of matrix A

(3 marks)

ii. Find all the cofactors of matrix A

(3 marks)

iii. Hence, find the determinant of matrix A

(2 marks)

(d) Compute the interest on credit purchases of RM3,000 at 5% for 8 months.

(2 marks)

(e) Find dy/dx for each of the following functions:

i. $\frac{d}{dx}(5x^6)$.

(1 marks)

ii. $\frac{d}{dx}(2x^{\frac{3}{2}})$.

(1 marks)

iii. $\frac{d}{dx}(6x^4 - x^3)$.

(1 marks)

iv. $\frac{d}{dx}(4x^{\frac{1}{2}} - 2x - 7)$.

(1 marks)

END OF EXAMINATION PAPER

MATHEMATICAL FORMULAE OF BUSINESS MATHEMATICS/MATHEMATICS FOR BUSINESS

FUNCTIONS & GRAPHS

Linear Function: $y = mx + c$ *or* $ax + by = c$ *Or* $y - y_1 = m(x - x_1)$ Slope, $m = \frac{y_2 - y_1}{x_2 - x_1}$	*Quadratic Function:* $y = ax^2 + bx + c = 0$ *Quadratic Formula:* $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ AOS: $x = -\frac{b}{2a}$, Vertex=$(x, f(x))$

APPLICATION OF FUNCTIONS

Break-Even Point = $\frac{\textbf{Fixed Cost}}{\textbf{Selling Price per Unit} - \textbf{Variable Cos per Unit}}$	*Break-Even Point:* $R(x) = C(x)$ $R(x) = Px \,/\, TC = FC + VC \,/\, P(x) = R(x) - C(x)$

MATRICES

2 x 2 Matrix $A^{-1} = \frac{1}{ad - bc}\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$	2 x 2 Matrix $\lvert A \rvert = ad - bc$

3 x 3 Matrix

$$A^{-1} = \frac{1}{\det(A)} adj(A)$$

Or

$$A^{-1} = \frac{1}{\det(A)} (cofactor\ of\ matrix\ A(A))^T$$

SEQUENCES

ARITHMETIC SEQUENCE	GEOMETRIC SEQUENCE
$T_n = a + (n-1)d$	$T_n = ar^{n-1}$
$S_n = \frac{n}{2}[2a + (n-1)d]$	$S_n = \frac{a(1 - r^n)}{1 - r}$, $r < 1$ $S_n = \frac{a(r^n - 1)}{r - 1}$, $r > 1$

INTEREST

SIMPLE INTEREST	COMPOUND INTEREST
$I = \Pr t$	$A \text{ or } S = P(1 + r)^n$ $A \text{ or } S = P\left(1 + \frac{j}{m}\right)^{mt}$
$A \text{ or } S = P + I$	$r = \left(1 + \frac{j}{m}\right)^m - 1$

ANNUITY	
FUTURE VALUE	PRESENT VALUE
$S = R\frac{(1+r)^n - 1}{r}$	$A = R\frac{1-(1+r)^{-n}}{r}$

TRADE AND CASH DISCOUNT	
Net Price = List Price – Trade Discount = (1 – Trade Discount) x List Price	
Amount Credited = Partial Payment / (1 – d)	
Balance of Account = Value of Invoice – Amount Credited	
MARKUP AND MARKDOWN	
MARKUP	MARKDOWN
$C + MU = SP$	$OP - RP = MD$
$SP = C + OE + NP$	
DIFFERENTIATION	
STANDARD FORM	**GENERAL FORM**
$\frac{d}{dx}\ln x = \frac{1}{x}$	$\frac{d}{dx}\ln f(x) = \frac{f'(x)}{f(x)}$
$\frac{d}{dx}e^x = e^x$	$\frac{d}{dx}e^{f(x)} = f'(x)e^{f(x)}$
INTEGRATION	
STANDARD FORM	**GENERAL FORM** Where : $f(x) = ax + b$
$\int e^x dx = e^x + c$	$\int e^{f(x)} dx = \frac{e^{f(x)}}{f'(x)} + c$
$\int \frac{1}{x} dx = \ln\lvert x\rvert + c$	$\int \frac{1}{f(x)} dx = \frac{\ln\lvert f(x)\rvert}{f'(x)} + c$

Compound Interest Table

	INTEREST RATE PER COMPOUNDING PERIOD										
PERIOD	1%	1½%	2%	2½%	3%	4%	5%	6%	8%	10%	PERIOD
1	1.01000	1.01500	1.02000	1.02500	1.03000	1.04000	1.05000	1.06000	1.08000	1.10000	1
2	1.02010	1.03023	1.04040	1.05063	1.06090	1.08160	1.10250	1.12360	1.16640	1.21000	2
3	1.03030	1.04568	1.06121	1.07689	1.09273	1.12486	1.15763	1.19102	1.25971	1.33100	3
4	1.04060	1.06136	1.08243	1.10381	1.12551	1.16986	1.21551	1.26248	1.36049	1.46410	4
5	1.05101	1.07728	1.10408	1.13141	1.15927	1.21665	1.27628	1.33823	1.46933	1.61051	5
6	1.06152	1.09344	1.12616	1.15969	1.19405	1.26532	1.34010	1.41852	1.58687	1.77156	6
7	1.07214	1.10984	1.14869	1.18869	1.22987	1.31593	1.40710	1.50363	1.71382	1.94872	7
8	1.08286	1.12649	1.17166	1.21840	1.26677	1.36857	1.47746	1.59385	1.85093	2.14359	8
9	1.09369	1.14339	1.19509	1.24886	1.30477	1.42331	1.55133	1.68948	1.99900	2.35795	9
10	1.10462	1.16054	1.21899	1.28008	1.34392	1.48024	1.62889	1.79085	2.15892	2.59374	10
11	1.11567	1.17795	1.24337	1.31209	1.38423	1.53945	1.71034	1.89830	2.33164	2.85312	11
12	1.12683	1.19562	1.26824	1.34489	1.42576	1.60103	1.79586	2.01220	2.51817	3.13843	12
13	1.13809	1.21355	1.29361	1.37851	1.46853	1.66507	1.88565	2.13293	2.71962	3.45227	13
14	1.14947	1.23176	1.31948	1.41297	1.51259	1.73168	1.97993	2.26090	2.93719	3.79750	14
15	1.16097	1.25023	1.34587	1.44830	1.55797	1.80094	2.07893	2.39656	3.17217	4.17725	15
16	1.17258	1.26899	1.37279	1.48451	1.60471	1.87298	2.18287	2.54035	3.42594	4.59497	16
17	1.18430	1.28802	1.40024	1.52162	1.65285	1.94790	2.29202	2.69277	3.70002	5.05447	17
18	1.19615	1.30734	1.42825	1.55966	1.70243	2.02582	2.40662	2.85434	3.99602	5.55992	18
19	1.20811	1.32695	1.45681	1.59865	1.75351	2.10685	2.52695	3.02560	4.31570	6.11591	19
20	1.22019	1.34686	1.48595	1.63862	1.80611	2.19112	2.65330	3.20714	4.66096	6.72750	20
21	1.23239	1.36706	1.51567	1.67958	1.86029	2.27877	2.78596	3.39956	5.03383	7.40025	21
22	1.24472	1.38756	1.54598	1.72157	1.91610	2.36992	2.92526	3.60354	5.43654	8.14027	22
23	1.25716	1.40838	1.57690	1.76461	1.97359	2.46472	3.07152	3.81975	5.87146	8.95430	23
24	1.26973	1.42950	1.60844	1.80873	2.03279	2.56330	3.22510	4.04893	6.34118	9.84973	24
25	1.28243	1.45095	1.64061	1.85394	2.09378	2.66584	3.38635	4.29187	6.84848	10.83471	25
26	1.29526	1.47271	1.67342	1.90029	2.15659	2.77247	3.55567	4.54938	7.39635	11.91818	26
27	1.30821	1.49480	1.70689	1.94780	2.22129	2.88337	3.73346	4.82235	7.98806	13.10999	27
28	1.32129	1.51722	1.74102	1.99650	2.28793	2.99870	3.92013	5.11169	8.62711	14.42099	28
29	1.33450	1.53998	1.77584	2.04641	2.35657	3.11865	4.11614	5.41839	9.31727	15.86309	29
30	1.34785	1.56308	1.81136	2.09757	2.42726	3.24340	4.32194	5.74349	10.06266	17.44940	30

Present Value of a Dollar Table

	INTEREST RATE PER PERIOD										
PERIOD	1%	1½%	2%	2½%	3%	4%	5%	6%	8%	10%	PERIOD
1	.99010	.98522	.98039	.97561	.97087	.96154	.95238	.94340	.92593	.90909	1
2	.98030	.97066	.96117	.95181	.94260	.92456	.90703	.89000	.85734	.82645	2
3	.97059	.95632	.94232	.92860	.91514	.88900	.86384	.83962	.79383	.75131	3
4	.96098	.94218	.92385	.90595	.88849	.85480	.82270	.79209	.73503	.68301	4
5	.95147	.92826	.90573	.88385	.86261	.82193	.78353	.74726	.68058	.62092	5
6	.94205	.91454	.88797	.86230	.83748	.79031	.74622	.70496	.63017	.56447	6
7	.93272	.90103	.87056	.84127	.81309	.75992	.71068	.66506	.58349	.51316	7
8	.92348	.88771	.85349	.82075	.78941	.73069	.67684	.62741	.54027	.46651	8
9	.91434	.87459	.83676	.80073	.76642	.70259	.64461	.59190	.50025	.42410	9
10	.90529	.86167	.82035	.78120	.74409	.67556	.61391	.55839	.46319	.38554	10
11	.89632	.84893	.80426	.76214	.72242	.64958	.58468	.52679	.42888	.35049	11
12	.88745	.83639	.78849	.74356	.70138	.62460	.55684	.49697	.39711	.31863	12
13	.87866	.82403	.77303	.72542	.68095	.60057	.52032	.46884	.36770	.28966	13
14	.86996	.81185	.75788	.70773	.66112	.57748	.50507	.44230	.34036	.26333	14
15	.86135	.79985	.74301	.69047	.64186	.55526	.48102	.41727	.31524	.23939	15
16	.85282	.78803	.72845	.67362	.62317	.53391	.45811	.39365	.29189	.21763	16
17	.84438	.77639	.71416	.65720	.60502	.51337	.43630	.37136	.27027	.19784	17
18	.83602	.76491	.70016	.64117	.58739	.49363	.41552	.35034	.25025	.17986	18
19	.82774	.75361	.68643	.62553	.57029	.47464	.39573	.33051	.23171	.16351	19
20	.81954	.74247	.67297	.61027	.55368	.45639	.37689	.31180	.21455	.14864	20

Amount of an Annuity Table

PERIOD	INTEREST RATE PER PERIOD											PERIOD
n	1%	1½%	2%	2½%	3%	4%	5%	6%	8%	10%	12%	*n*
1	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1
2	2.01000	2.01500	2.02000	2.02500	2.03000	2.04000	2.05000	2.06000	2.08000	2.10000	2.12000	2
3	3.03010	3.04522	3.06040	3.07562	3.09090	3.12160	3.15250	3.18360	3.24640	3.31000	3.37440	3
4	4.06040	4.09090	4.12161	4.15252	4.18363	4.24646	4.31013	4.37462	4.50611	4.64100	4.77933	4
5	5.10101	5.15227	5.20404	5.25633	5.30914	5.41632	5.52563	5.63709	5.86660	6.10510	6.35285	5
6	6.15202	6.22955	6.30812	6.38774	6.46841	6.63298	6.80191	6.97532	7.33593	7.71561	8.11519	6
7	7.21354	7.32299	7.43428	7.54743	7.66246	7.89829	8.14201	8.39384	8.92280	9.48717	10.08901	7
8	8.28567	8.43284	8.58297	8.73612	8.89234	9.21423	9.54911	9.89747	10.63663	11.43589	12.29969	8
9	9.36853	9.55933	9.75463	9.95452	10.15911	10.58280	11.02656	11.49132	12.48756	13.57948	14.77566	9
10	10.46221	10.70272	10.94972	11.20338	11.46388	12.00611	12.57789	13.18079	14.48656	15.93742	17.54874	10
11	11.56683	11.86326	12.16872	12.48347	12.80780	13.48635	14.20679	14.97164	16.64549	18.53117	20.65458	11
12	12.68250	13.04121	13.41209	13.79555	14.19203	15.02581	15.91713	16.86994	18.97713	21.38428	24.13313	12
13	13.80933	14.23683	14.68033	15.14044	15.61779	16.62684	17.71298	18.88214	21.49530	24.52271	28.02911	13
14	14.94742	15.45038	15.97394	16.51895	17.08632	18.29191	19.59863	21.01507	24.21492	27.97498	32.39260	14
15	16.09690	16.68214	17.29342	17.93193	18.59891	20.02359	21.57856	23.27597	27.15211	31.77248	37.27971	15
16	17.25786	17.93237	18.63929	19.38022	20.15688	21.82453	23.65749	25.67253	30.32428	35.94973	42.75328	16
17	18.43044	19.20136	20.01207	20.86473	21.76159	23.69751	25.84037	28.21288	33.75023	40.54470	48.88367	17
18	19.61475	20.48938	21.41231	22.38635	23.41444	25.64541	28.13238	30.90565	37.45024	45.59917	55.74971	18
19	20.81090	21.79672	22.84056	23.94601	25.11687	27.67123	30.53900	33.75999	41.44626	51.15909	63.43968	19
20	22.01900	23.12367	24.29737	25.54466	26.87037	29.77808	33.06595	36.78559	45.76196	57.27500	72.05244	20
21	23.23919	24.47052	25.78332	27.18327	28.67649	31.96920	35.71925	39.99273	50.42292	64.00250	81.69874	21
22	24.47159	25.83758	27.29898	28.86286	30.53678	34.24797	38.50521	43.39229	55.45676	71.40275	92.50258	22
23	25.71630	27.22514	28.84496	30.58443	32.45288	36.61789	41.43048	46.99583	60.89330	79.54302	104.60289	23
24	26.97346	28.63352	30.42186	32.34904	34.42647	39.08260	44.50200	50.81558	66.76476	88.49733	118.15524	24
25	28.24320	30.06302	32.03030	34.15776	36.45926	41.64591	47.72710	54.86451	73.10594	98.34706	133.33387	25
26	29.52563	31.51397	33.67091	36.01171	38.55304	44.31174	51.11345	59.15638	79.95442	109.18177	150.33393	26
27	30.82089	32.98668	35.34432	37.91200	40.70963	47.08421	54.66913	63.70577	87.35077	121.09994	169.37401	27
28	32.12910	34.48148	37.05121	39.85980	42.93092	49.96758	58.40258	68.52811	95.33883	134.20994	190.69889	28
29	33.45039	35.99870	38.79223	41.85630	45.21885	52.96629	62.32271	73.63980	103.96594	148.63093	214.58275	29
30	34.78489	37.53868	40.56808	43.90270	47.57542	56.08494	66.43885	79.05819	113.28321	164.49402	241.33268	30
31	36.13274	39.10176	42.37944	46.00027	50.00268	59.32834	70.76079	84.80168	123.34587	181.94342	271.29261	31
32	37.86901	40.68829	44.22703	48.15028	52.50276	62.70147	75.29883	90.88978	134.21354	201.13777	304.84772	32
33	38.86901	42.29861	46.11157	50.35403	55.07784	66.20953	80.06377	97.34316	145.95062	222.25154	342.42945	33
34	40.25770	43.93309	48.03380	52.61289	57.73018	69.85791	85.06696	104.18375	158.62667	245.47670	384.52098	34
35	41.66028	45.59209	49.99448	54.92821	60.46208	73.65222	90.32031	111.43478	172.31680	271.02437	431.66350	35