**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENGAJIAN TINGGI**

JABATAN PERDAGANGAN

PEPERIKSAAN AKHIR

SESI II : 2021 / 2022

DPB20053: BUSINESS MATHEMATICS

**TARIKH : 04 JULAI 2022
MASA : 2.30 PETANG – 4.30 PETANG (2 JAM)**

Kertas ini mengandungi **LAPAN (8)** halaman bercetak.
Struktur (4 soalan)

Dokumen sokongan yang disertakan : Jadual, Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SECTION A : 100 MARKS
BAHAGIAN A : 100 MARKAH

INSTRUCTION:
This section consists of **FOUR (4)** structured questions. Answer **ALL** questions.

ARAHAN:
Bahagian ini mengandungi EMPAT (4) soalan struktur. Jawab SEMUA soalan.

QUESTION 1
SOALAN 1

CLO1
C1

a) (i)   Identify the value of x using quadratic formula.
          Kenal pasti nilai x dengan menggunakan formula kuadratik.

$$(2x + 3)(x + 9)$$

[4 marks]
[*4 markah*]

   (ii) Identify the value of a and b for the following equations using the substitution
         method.
         Kenal pasti nilai a dan b bagi persamaan berikut dengan menggunakan kaedah
         penggantian.

$$4a - 5b = -23$$
$$2a + b = -1$$

[6 marks]
[*6 markah*]

CLO1
C2

b) Mai Masak Sdn Bhd had launched a new product called Paprikano. The
    following data was obtained from the company's book accounts: -
    Mai Masak Sdn Bhd telah melancarkan produk baru iaitu Paprikano. Data
    berikut diperoleh daripada akaun buku syarikat: -

Fixed cost	=	RM 5, 000
Variable cost	=	30% of the selling price per unit
Selling price (50 units)	=	RM 900

Kos tetap	=	*RM 5, 000*
Kos berubah	=	*30% daripada harga jualan seunit*
Harga jualan (50 unit)	=	*RM 900*

Based on the data given, yo are required to detail: -

Berdasarkan data yang diberikan, anda dikehendaki memperincikan: -

(i)   The total cost if 500 units of product are sold.

   Jumlah kos jika 500 unit produk dijual.

[7 marks]

[*7 markah*]

(ii)   The profit or loss gained for the number of units sold in b(i).

   Keuntungan atau kerugian yang diperoleh untuk bilangan unit yang dijual dalam b(i).

[3 marks]

[*3 markah*]

(iii)   The quantity of product that need to be sold if the company's target profit for the month is RM7, 000.

   Kuantiti produk yang perlu dijual jika sasaran keuntungan syarikat untuk sebulan ialah RM7, 000.

[5 marks]

[*5 markah*]

QUESTION 2
SOALAN 2

CLO1
C1

a) Best Ever Ltd produces electronics product for the Peninsular Malaysia market. Below is the information given by the company: -

Best Ever Ltd mengeluarkan produk elektronik untuk pasaran Semenanjung Malaysia. Berikut adalah maklumat yang diberikan oleh syarikat: -

Total sales volume = 12, 000 units

Price per unit = RM 20

Variable cost (100 units) = RM 1, 000

Fixed cost = RM 70, 000

Profit = RM 80, 000

Jumlah unit jualan = 12, 000 unit

Harga seunit = RM 20

Kos berubah (100 unit) = RM 1, 000

Kos tetap = RM 70, 000

Keuntungan = RM 80, 000

From the information given, you are required to count: -

Daripada maklumat yang diberikan, anda dikehendaki mengira: -

    (i)   The quantity and value in Break-Even Point (BEP)

             Kuantiti dan nilai dalam Titik Pulangan Modal (BEP)

[6 marks]

[*6 markah*]

    (ii)   The contribution margin (CM)

             Margin sumbangan (CM)

[2 marks]

[*2 markah*]

CLO1
C2

b) Elaborate the differentiation $\left(\frac{dy}{dx}\right)$ for the function $y(x) = \frac{7x^2+6}{2x^3-4}$

   Huraikan pembezaan $\left(\frac{dy}{dx}\right)$ untuk fungsi $y(x) = \frac{7x^2+6}{2x^3-4}$

[8 marks]

[8 markah]

CLO1
C3

c) Star Moon Company produces x units of table fan per month. The total cost per month is given as $C(x) = 0.02x^2 - 10x + 4,200$ and the selling price per unit is RM 250. You are required to calculate:

   Syarikat Star Moon menghasilkan x unit kipas meja setiap bulan. Jumlah kos sebulan diberikan sebagai C(x) = 0.02x² – 10x + 4,200 dan harga jualan bagi setiap unit ialah RM 250. Anda dikehendaki mengira:

   (i)   The average cost when 1,500 units are produced

        Kos purata apabila 1,500 unit dihasilkan

[4 marks]

[4 markah]

   (ii) The marginal profit when 800 units are sold

        Keuntungan marginal apabila 800 unit dijual

[5 marks]

[5 markah]

QUESTION 3

SOALAN 3

CLO2
C1

a) Hasni won an annuity that pays RM4, 300 at the end of every six months. If money is worth 7% compounded semi-annually, identify the present value of the annuity at the end of nine years.

   Hasni memenangi anuiti sebanyak RM4, 300 pada akhir setiap enam bulan. Jika wang tersebut bernilai 7% dikompaunkan pada setiap setengah tahun, kenal pasti nilai semasa anuiti tersebut selepas sembilan tahun.

[5 marks]

[5 markah]

**CLO2
C2**

b) Mr. Rahul wants to buy a semi-detached house at Taman Singgahsana worth RM410, 000. The developer requires 3% as a down payment and the balance of price can be borrowed from the financial institution which offers at 3% per annum for 30 years. Also, Mr. Rahul has had to pay extra payment such as lawyer fee RM4, 500 and insurance RM21, 000. Locate the total interest paid and the monthly payment.

Encik Rahul ingin membeli rumah berkembar di Taman Singgahsana bernilai RM410, 000. Pemaju memerlukan 3% sebagai bayaran pendahuluan dan baki harga boleh dipinjam daripada institusi kewangan yang menawarkan faedah sebanyak 3% setahun selama 30 tahun. Selain itu, Encik Rahul juga perlu membayar bayaran tambahan seperti yuran guaman sebanyak RM4, 500 dan insurans sebanyak RM21, 000. Carikan jumlah faedah yang dibayar dan bayaran bulanan.

[8 marks]

[*8 markah*]

**CLO2
C3**

c) ABC Group Bhd has a note dated 14 March 2019 for RM8, 300 with interest at 5% per annum. The term of the note is 130 days. If the company discounts the note on 07 June 2019 at a bank that charged a discount rate of 8%, calculate: -

ABC Group Bhd mempunyai nota bertarikh 14 Mac 2019 yang bernilai RM8, 300 dengan kadar faedah sebanyak 5% setahun. Tempoh nota adalah selama 130 hari. Jika syarikat itu mendiskaunkan nota tersebut pada 07 Jun 2019 di bank yang mengenakan kadar diskaun sebanyak 8%, kirakan: -

(i) The maturity date / *Tarikh matang*

[2 marks]

[*2 markah*]

(ii) The maturity value / *Nilai matang*

[4 marks]

[*4 markah*]

(iii) The discount period / *Tempoh diskaun*

[2 marks]

[*2 markah*]

(iv) The proceeds

    Hasil

[4 marks]

[*4 markah*]

QUESTION 4

SOALAN 4

CLO2
C1

a)   Shashi Sdn. Bhd. intends to invest in a new project. They want to choose the best project to increase their production and profit. The cash flow for two projects are as follows.

Shashi Sdn. Bhd. bercadang untuk melabur dalam projek baharu. Mereka mahu memilih projek terbaik untuk meningkatkan pengeluaran dan keuntungan mereka. Aliran tunai bagi dua projek adalah seperti berikut.

Year	Cash Flows (RM)	
	Project X	**Project Y**
0	(38, 500)	(39, 000)
1	10, 000	9, 000
2	12, 000	18, 000
3	15, 000	11, 000
4	17, 000	14, 000

Count Net Present Value (NPV) of the two projects and suggest which of the two projects should be accepted assuming the discount rate is 10%.

Kirakan Nilai Kini Bersih bagi kedua-dua projek tersebut dan cadangkan yang mana satu daripada kedua-dua projek tersebut harus diterima dengan anggapan kadar diskaun adalah 10%.

[10 marks]

[*10 markah*]

The table below shows the transportation costs for a unit of bag produced by Dilala Company.

Jadual di bawah menunjukkan kos pengangkutan bagi satu unit beg yang dikeluarkan oleh Syarikat Dilala.

From / *Dari*	To / *Ke*		
	City S / *Bandar S*	City T / *Bandar T*	City U / *Bandar U*
Factory A / *Kilang A*	12	17	13
Factory B / *Kilang B*	18	10	11
Factory C / *Kilang C*	14	9	15

Additional information:

Maklumat tambahan:

<u>Factory / *Kilang*</u>   <u>City / *City*</u>

A   =   220 units   S   =   160 units

B   =   150 units   T   =   200 units

C   =   170 units   U   =   180 units

You are required to:

Anda dikehendaki:

CLO2 C2

b)   Express the transportation matrix table.

Nyatakan jadual matriks pengangkutan.

[5 marks]

[*5 markah*]

CLO2 C3

c)   Calculate the initial solution by using North West Corner Method.

Kirakan penyelesaian awal dengan menggunakan Kaedah Pepenjuru Barat-Laut.

[10 marks]

[*10 markah*]

SOALAN TAMAT

Table A-4 Present Value Interest Factors for a One-Dollar Annuity Discounted at k Percent for n Periods: PVIFA = $[1 - 1/(1 + k)^n] / k$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8333	0.8065	0.8000	0.7692
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.7125	1.6901	1.6681	1.6467	1.6257	1.6052	1.5278	1.4568	1.4400	1.3609
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4437	2.4018	2.3612	2.3216	2.2832	2.2459	2.1065	1.9813	1.9520	1.8161
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.1024	3.0373	2.9745	2.9137	2.8550	2.7982	2.5887	2.4043	2.3616	2.1662
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6959	3.6048	3.5172	3.4331	3.3522	3.2743	2.9906	2.7454	2.6893	2.4356
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.2305	4.1114	3.9975	3.8887	3.7845	3.6847	3.3255	3.0205	2.9514	2.6427
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.7122	4.5638	4.4226	4.2883	4.1604	4.0386	3.6046	3.2423	3.1611	2.8021
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	5.1461	4.9676	4.7988	4.6389	4.4873	4.3436	3.8372	3.4212	3.3289	2.9247
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.5370	5.3282	5.1317	4.9464	4.7716	4.6065	4.0310	3.5655	3.4631	3.0190
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.8892	5.6502	5.4262	5.2161	5.0188	4.8332	4.1925	3.6819	3.5705	3.0915
11	10.368	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	6.2065	5.9377	5.6869	5.4527	5.2337	5.0286	4.3271	3.7757	3.6564	3.1473
12	11.255	10.575	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.4924	6.1944	5.9176	5.6603	5.4206	5.1971	4.4392	3.8514	3.7251	3.1903
13	12.134	11.348	10.635	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.7499	6.4235	6.1218	5.8424	5.5831	5.3423	4.5327	3.9124	3.7801	3.2233
14	13.004	12.106	11.296	10.563	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.9819	6.6282	6.3025	6.0021	5.7245	5.4675	4.6106	3.9616	3.8241	3.2487
15	13.865	12.849	11.938	11.118	10.380	9.7122	9.1079	8.5595	8.0607	7.6061	7.1909	6.8109	6.4624	6.1422	5.8474	5.5755	4.6755	4.0013	3.8593	3.2682
16	14.718	13.578	12.561	11.652	10.838	10.106	9.4466	8.8514	8.3126	7.8237	7.3792	6.9740	6.6039	6.2651	5.9542	5.6685	4.7296	4.0333	3.8874	3.2832
17	15.562	14.292	13.166	12.166	11.274	10.477	9.7632	9.1216	8.5436	8.0216	7.5488	7.1196	6.7291	6.3729	6.0472	5.7487	4.7746	4.0591	3.9099	3.2948
18	16.398	14.992	13.754	12.659	11.690	10.828	10.059	9.3719	8.7556	8.2014	7.7016	7.2497	6.8399	6.4674	6.1280	5.8178	4.8122	4.0799	3.9279	3.3037
19	17.226	15.678	14.324	13.134	12.085	11.158	10.336	9.6036	8.9501	8.3649	7.8393	7.3658	6.9380	6.5504	6.1982	5.8775	4.8435	4.0967	3.9424	3.3105
20	18.046	16.351	14.877	13.590	12.462	11.470	10.594	9.8181	9.1285	8.5136	7.9633	7.4694	7.0248	6.6231	6.2593	5.9288	4.8696	4.1103	3.9539	3.3158
21	18.857	17.011	15.415	14.029	12.821	11.764	10.836	10.017	9.2922	8.6487	8.0751	7.5620	7.1016	6.6870	6.3125	5.9731	4.8913	4.1212	3.9631	3.3198
22	19.660	17.658	15.937	14.451	13.163	12.042	11.061	10.201	9.4424	8.7715	8.1757	7.6446	7.1695	6.7429	6.3587	6.0113	4.9094	4.1300	3.9705	3.3230
23	20.456	18.292	16.444	14.857	13.489	12.303	11.272	10.371	9.5802	8.8832	8.2664	7.7184	7.2297	6.7921	6.3988	6.0442	4.9245	4.1371	3.9764	3.3254
24	21.243	18.914	16.936	15.247	13.799	12.550	11.469	10.529	9.7066	8.9847	8.3481	7.7843	7.2829	6.8351	6.4338	6.0726	4.9371	4.1428	3.9811	3.3272
25	22.023	19.523	17.413	15.622	14.094	12.783	11.654	10.675	9.8226	9.0770	8.4217	7.8431	7.3300	6.8729	6.4641	6.0971	4.9476	4.1474	3.9849	3.3286
30	25.808	22.396	19.600	17.292	15.372	13.765	12.409	11.258	10.274	9.4269	8.6938	8.0552	7.4957	7.0027	6.5660	6.1772	4.9789	4.1601	3.9950	3.3321
35	29.409	24.999	21.487	18.665	16.374	14.498	12.948	11.655	10.567	9.6442	8.8552	8.1755	7.5856	7.0700	6.6166	6.2153	4.9915	4.1644	3.9984	3.3330
36	30.108	25.489	21.832	18.908	16.547	14.621	13.035	11.717	10.612	9.6765	8.8786	8.1924	7.5979	7.0790	6.6231	6.2201	4.9929	4.1649	3.9987	3.3331
40	32.835	27.355	23.115	19.793	17.159	15.046	13.332	11.925	10.757	9.7791	8.9511	8.2438	7.6344	7.1050	6.6418	6.2335	4.9966	4.1659	3.9995	3.3332
50	39.196	31.424	25.730	21.482	18.256	15.762	13.801	12.233	10.962	9.9148	9.0417	8.3045	7.6752	7.1327	6.6605	6.2463	4.9995	4.1666	3.9999	3.3333

Table A-3 Present Value Interest Factors for One Dollar Discounted at k Percent for n Periods: $PVIF_{k,n} = 1 / (1 + k)^n$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8333	0.8065	0.8000	0.7692
2	0.9803	0.9612	0.9426	0.9246	0.9070	0.8900	0.8734	0.8573	0.8417	0.8264	0.8116	0.7972	0.7831	0.7695	0.7561	0.7432	0.6944	0.6504	0.6400	0.5917
3	0.9706	0.9423	0.9151	0.8890	0.8638	0.8396	0.8163	0.7938	0.7722	0.7513	0.7312	0.7118	0.6931	0.6750	0.6575	0.6407	0.5787	0.5245	0.5120	0.4552
4	0.9610	0.9238	0.8885	0.8548	0.8227	0.7921	0.7629	0.7350	0.7084	0.6830	0.6587	0.6355	0.6133	0.5921	0.5718	0.5523	0.4823	0.4230	0.4096	0.3501
5	0.9515	0.9057	0.8626	0.8219	0.7835	0.7473	0.7130	0.6806	0.6499	0.6209	0.5935	0.5674	0.5428	0.5194	0.4972	0.4761	0.4019	0.3411	0.3277	0.2693
6	0.9420	0.8880	0.8375	0.7903	0.7462	0.7050	0.6663	0.6302	0.5963	0.5645	0.5346	0.5066	0.4803	0.4556	0.4323	0.4104	0.3349	0.2751	0.2621	0.2072
7	0.9327	0.8706	0.8131	0.7599	0.7107	0.6651	0.6227	0.5835	0.5470	0.5132	0.4817	0.4523	0.4251	0.3996	0.3759	0.3538	0.2791	0.2218	0.2097	0.1594
8	0.9235	0.8535	0.7894	0.7307	0.6768	0.6274	0.5820	0.5403	0.5019	0.4665	0.4339	0.4039	0.3762	0.3506	0.3269	0.3050	0.2326	0.1789	0.1678	0.1226
9	0.9143	0.8368	0.7664	0.7026	0.6446	0.5919	0.5439	0.5002	0.4604	0.4241	0.3909	0.3606	0.3329	0.3075	0.2843	0.2630	0.1938	0.1443	0.1342	0.0943
10	0.9053	0.8203	0.7441	0.6756	0.6139	0.5584	0.5083	0.4632	0.4224	0.3855	0.3522	0.3220	0.2946	0.2697	0.2472	0.2267	0.1615	0.1164	0.1074	0.0725
11	0.8963	0.8043	0.7224	0.6496	0.5847	0.5268	0.4751	0.4289	0.3875	0.3505	0.3173	0.2875	0.2607	0.2366	0.2149	0.1954	0.1346	0.0938	0.0859	0.0558
12	0.8874	0.7885	0.7014	0.6246	0.5568	0.4970	0.4440	0.3971	0.3555	0.3186	0.2858	0.2567	0.2307	0.2076	0.1869	0.1685	0.1122	0.0757	0.0687	0.0429
13	0.8787	0.7730	0.6810	0.6006	0.5303	0.4688	0.4150	0.3677	0.3262	0.2897	0.2575	0.2292	0.2042	0.1821	0.1625	0.1452	0.0935	0.0610	0.0550	0.0330
14	0.8700	0.7579	0.6611	0.5775	0.5051	0.4423	0.3878	0.3405	0.2992	0.2633	0.2320	0.2046	0.1807	0.1597	0.1413	0.1252	0.0779	0.0492	0.0440	0.0254
15	0.8613	0.7430	0.6419	0.5553	0.4810	0.4173	0.3624	0.3152	0.2745	0.2394	0.2090	0.1827	0.1599	0.1401	0.1229	0.1079	0.0649	0.0397	0.0352	0.0195
16	0.8528	0.7284	0.6232	0.5339	0.4581	0.3936	0.3387	0.2919	0.2519	0.2176	0.1883	0.1631	0.1415	0.1229	0.1069	0.0930	0.0541	0.0320	0.0281	0.0150
17	0.8444	0.7142	0.6050	0.5134	0.4363	0.3714	0.3166	0.2703	0.2311	0.1978	0.1696	0.1456	0.1252	0.1078	0.0929	0.0802	0.0451	0.0258	0.0225	0.0116
18	0.8360	0.7002	0.5874	0.4936	0.4155	0.3503	0.2959	0.2502	0.2120	0.1799	0.1528	0.1300	0.1108	0.0946	0.0808	0.0691	0.0376	0.0208	0.0180	0.0089
19	0.8277	0.6864	0.5703	0.4746	0.3957	0.3305	0.2765	0.2317	0.1945	0.1635	0.1377	0.1161	0.0981	0.0829	0.0703	0.0596	0.0313	0.0168	0.0144	0.0068
20	0.8195	0.6730	0.5537	0.4564	0.3769	0.3118	0.2584	0.2145	0.1784	0.1486	0.1240	0.1037	0.0868	0.0728	0.0611	0.0514	0.0261	0.0135	0.0115	0.0053
21	0.8114	0.6598	0.5375	0.4388	0.3589	0.2942	0.2415	0.1987	0.1637	0.1351	0.1117	0.0926	0.0768	0.0638	0.0531	0.0443	0.0217	0.0109	0.0092	0.0040
22	0.8034	0.6468	0.5219	0.4220	0.3418	0.2775	0.2257	0.1839	0.1502	0.1228	0.1007	0.0826	0.0680	0.0560	0.0462	0.0382	0.0181	0.0088	0.0074	0.0031
23	0.7954	0.6342	0.5067	0.4057	0.3256	0.2618	0.2109	0.1703	0.1378	0.1117	0.0907	0.0738	0.0601	0.0491	0.0402	0.0329	0.0151	0.0071	0.0059	0.0024
24	0.7876	0.6217	0.4919	0.3901	0.3101	0.2470	0.1971	0.1577	0.1264	0.1015	0.0817	0.0659	0.0532	0.0431	0.0349	0.0284	0.0126	0.0057	0.0047	0.0018
25	0.7798	0.6095	0.4776	0.3751	0.2953	0.2330	0.1842	0.1460	0.1160	0.0923	0.0736	0.0588	0.0471	0.0378	0.0304	0.0245	0.0105	0.0046	0.0038	0.0014
30	0.7419	0.5521	0.4120	0.3083	0.2314	0.1741	0.1314	0.0994	0.0754	0.0573	0.0437	0.0334	0.0256	0.0196	0.0151	0.0116	0.0042	0.0016	0.0012	*
35	0.7059	0.5000	0.3554	0.2534	0.1813	0.1301	0.0937	0.0676	0.0490	0.0356	0.0259	0.0189	0.0139	0.0102	0.0075	0.0055	0.0017	0.0005	*	*
36	0.6989	0.4902	0.3450	0.2437	0.1727	0.1227	0.0875	0.0626	0.0449	0.0323	0.0234	0.0169	0.0123	0.0089	0.0065	0.0048	0.0014	*	*	*
40	0.6717	0.4529	0.3066	0.2083	0.1420	0.0972	0.0668	0.0460	0.0318	0.0221	0.0154	0.0107	0.0075	0.0053	0.0037	0.0026	0.0007	*	*	*
50	0.6080	0.3715	0.2281	0.1407	0.0872	0.0543	0.0339	0.0213	0.0134	0.0085	0.0054	0.0035	0.0022	0.0014	0.0009	0.0006	*	*	*	*

FORMULA BUSINESS MATHEMATIC

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$P = pQ - VCQ - FC$$

$$P = TR - TC$$

$$TC = VCQ + FC$$

$$TR = pQ$$

$$TVC = VCQ$$

$$BEP(Q) = \frac{FC}{p - VC}$$

$$BEP(RM) = BEP(Q) \; x \; p$$

$$CM = p - VC$$

$$CMR = \frac{p - VC}{p} \; x \; 100$$

$$\frac{dy}{dx} = nx^{n-1}$$

$$\frac{dy}{dx} = nx^{n-1} + 0$$

$$\frac{dy}{dx} = anx^{n-1}$$

$$\frac{dy}{dx} = anx^{n-1} + bmx^{m-1}$$

$$\frac{dy}{dx} = u\frac{dv}{dx} + v\frac{du}{dx}$$

$$\frac{dy}{dx} = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$$

$$\frac{dy}{dx} = \frac{dy}{du} \; x \; \frac{du}{dx}$$

$$I = Prt$$

$$I = IP - CP$$

$$I = \left(\frac{Pr+Yr}{2}\right)t \quad or \quad I = \frac{Pr(t+1)}{2}$$

$$Y = \frac{P}{t}$$

$$DP = Rate\,(\%) \; x \; CP$$

$$P = CP - DP + other\ payments$$

$$S = P + I$$

$$S = P(1 + rt)$$

$$D = Sdt$$

$$H = S - D$$

$$MP = \frac{S}{n}$$

$$IP = DP + (MP \; x \; n) \; @ \; DP + S \; @ \; DP + P + I$$

$$R = \frac{\sum n}{\sum N} \; x \; I \quad and \quad \sum n = \left(\frac{n+1}{2}\right)n, \quad \sum N = \left(\frac{N+1}{2}\right)N$$

$$EP = (n \; x \; MP) - R$$

$$S = P\left(1 + \frac{i}{m}\right)^{n.m}$$

$$P = \frac{S}{\left(1 + \frac{i}{m}\right)^{n.m}}$$

$$P = R\left(\frac{1 - \left(1 + \frac{i}{m}\right)^{-n.m}}{\frac{i}{m}}\right) \quad and \quad R = \frac{P\left(\frac{i}{m}\right)}{1 - \left(1 + \frac{i}{m}\right)^{-n.m}}$$

$$S = R\left(\frac{\left(1 + \frac{i}{m}\right)^{n.m} - 1}{\frac{i}{m}}\right) \quad and \quad R = \frac{S\left(\frac{i}{m}\right)}{\left(1 + \frac{i}{m}\right)^{n.m} - 1}$$

$$PP = \frac{IO}{ACF}$$

$$PP = T + \frac{IO - \sum CF_T}{CF_{T+1}}$$

$$ARR = \frac{Average\ CF - Dep.}{IO} \; x \; 100$$

$$NPV = ACF(PVIFA, k\%, n) - IO$$

$$PI = \frac{TPV}{IO}$$