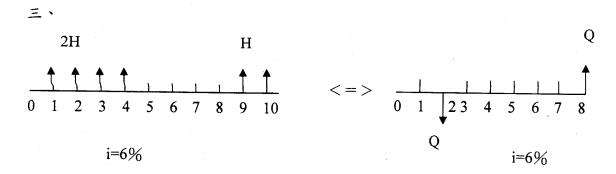
- 一、中華玩具公司,目前向外採購金屬零件,此零件用於某項玩具之製造,但是公司有人提議自製或外包此項零件。若為自製,製造作業需要兩部機器:機器 A 成本 18,000 元、壽命 6 年、殘值 500 元。機器 A 3 年後需要維修成本為 3,000 元;每年操作成本機器 A 為 6,000 元,機器 B 為 5,000 元,兩部機器共需要 4 位工人,每一位工人每小時成本為 12.50 元,正常 8 小時期間,工人兩部機器所生產零件足夠製造 1,000 個玩具;若外包,則需購買機器一部,成本為 71,000 元、壽命 5 年、沒有操作成本及殘值,每個玩具金屬零件另需付外包費用為每個 0.45 元;但若外購每個玩具金屬零件購價為 0.60 元。試問中華公司應自製、外包或外購?假設 MARR 為 12%。(20%)
- 二、 黃老師在中華大學前購買一棟價值 1600 萬之房子,並立即向中華銀行貸款 1000 萬元,前五年只還利息不還本金,在第六年開始連續二十年每年等額償還本利和,中華銀行宣稱借款前 13年利率為 6%,之後 12 年利率為 12%。請回答下列問題:(30%)
 - (1)借款期間前 13 年,每月名義利率與實際利率為何?
 - (2)借款期間後12年,每年名義利率與實際利率為何?
 - (3)從第六年第一個月開始黃老師每月需等額償還多少貸款?
 - (4)若黃老師在第20年底想償還所有貸款,請問應償還多少?



上列二現金流量圖有相同之當量值,試求H及Q之關係

四、上題中期間 5-6 之利率改為 12%,其餘期間利率不變,試求 H 及 Q 之關係

五、如果你為某傳統產業負責人,試問如何決定公司之 MARR

0.5%	6		自	断現金流	充量:複	利因子值		0.5%	
	一次支付		等額系列支付				等差		
n	複利 F/P	現值 P/F	償債基金 A/F	複利 F/A	資本回收 A/P	現值 P/A	等差現值 P/G	等差年金系列	
1	1.0050	0.9950	1.00000	1.0000	1.00500	0.9950	1/0	A/G	
2	1.0100	0.9901	0.49875	2.0050	0.50375	1.9851	0.9901	0.4000	
3	1.0151	0.9851	0.33167	3.0150	0.33667	2.9702	2.9604	0.4988	
4	1.0202	0.9802	0.24813	4.0301	0.25313	3.9505	5.9011	1.4938	
5	1.0253	0.9754	0.19801	5.0503	0.20301	4.9259	9.8026	1.9900	
6	1.0304	0.9705	0.16460	6.0755	0.16960	5.8964	14.6552	2.4855	
7	1.0355	0.9657	0.14073	7.1059	0.14573	6.8621	20.4493	2.9801	
8	1.0407	0.9609	0.12283	8.1414	0.12783	7.8230	27.1755	3.4738	
9	1.0459	0.9561	0.10891	9.1821	0.11391	8.7791	34.8244	3.9668	
10	1.0511	0.9513	0.09777	10.2280	0.10277	9.7304	43.3865	4.4589	
11	1.0564	0.9466	0.08866	11.2792	0.09366	10.6770	52.8526	4.9501	
12	1.0617	0.9419	0.08107	12.3356	0.08607	11.6189	63.2136	5.4406	
13	1.0670	0.9372	0.07464	13.3972	0.07964	12.5562	74.4602	5.9302	
14	1.0723	0.9326	0.06914	14.4642	0.07414	13.4887	86.5835	6.4190	
15	1.0777	0.9279	0.06436	15.5365	0.06936	14.4166	99.5743	6.9069	
16	1.0831	0.9233	0.06019	16.6142	0.06519	15.3399	113.4238 .	7.3940	
17	1.0885	0.9187	0.05651	17.6973	0.06151	16.2586	128.1231	7.8803	
18	1.0939	0.9141	0.05323	18.7858	0.05823	17.1728	143.6634	8.3658	
19	1.0994	0.9096	0.05030	19.8797	0.05530	18.0824	160.0360	8.8504	
20	1.1049	0.9051	0.04767	20.9791	0.05267	18.9874	177.2322	9.3342	
21	1.1104	0.9006	0.04528	22.0840	0.05028	19.8880	195.2434	9.8172	
22	1.1160	0.8961	0.04311	23.1944	0.04811	20.7841	214.0611	10.2993	
23	1.1216	0.8916	0.04113	24.3104	0.04613	21.6757	233.6768	10.7806	
24	1.1272	0.8872	0.03932	25.4320	0.04432	22.5629	254.0820	11.2611	
25	1.1328	0.8828	0.03765	26.5591	0.04265	23.4456	275.2686	11.7407	
26	1.1385	0.8784	0.03611	27.6919	0.04111	24.3240	297.2281	12.2195	
27	1.1442	0.8740	0.03469	28.8304	0.03969	25.1980	319,9523	12.6975	
29	1.1499	0.8697	0.03336	29.9745	0.03836	26.0677	343,4332	13.1747	
30	1.1614	0.8653 0.8610	0.03213	31.1244	0.03713	26.9330	367.6625	13.6510	
36	1.1967	0.8356		32.2800	0.03598	27.7941	392.6324	14.1265	
40	1.2208	0.8191	0.02542	39.3361	0.03042	32.8710	557.5598	16.9621	
48	1.2705	0.8191	0.02203	44.1588	0.02765	36.1722	681.3347	18.8359	
50	1.2832	0.7793		54.0978	0.02349	42.5803	959.9188	22.5437	
52	1.2961	0.7716	0.01765	56.6452	0.02265	44.1428	1035.70	23.4624	
55	1.3156	0.7601	0.01584	59.2180	0.02189	45.6897	1113.82	24.3778	
60	1.3489	0.7414	0.01384	63.1258	0.02084	47.9814	1235.27	25.7447	
72	1.4320	0.6983	0.01455	86.4089	0.01933	51.7256	1448.65	28.0064	
75	1.4536	0.6879	0.01137	90.7265	0.01657	60.3395	2012.35	33.3504	
84	1.5204	0.6577	0.00961	104.0739	0.01602 0.01461	62.4136	2163.75	34.6679	
90	1.5666	0.6383	0.00883	113.3109	0.01383	68.4530 72.3313	2640.66	38.5763	
96	1.6141	0.6195	0.00814	122.8285	0.01314	76.0952	2976.08	41.1451	
100	1.6467	0.6073	0.00773	129.3337	0.01314	78.5426	3324.18 3562.79	43.6845	
108	1.7137	0.5835	0.00701	142.7399	0.01273	83.2934	4054.37	45.3613	
120	1.8194	0.5496	0.00610	163.8793	0.01201	90.0735		48.6758	
132	1.9316	0.5177	0.00537	186.3226	0.01110		4823.51	53.5508	
144	2.0508	0.4876	0.00337	210.1502	0.01037	96.4596	5624.59	58.3103	
240	3.3102	0.3021	0.00216	703777777777	- 17 Carlot Ing Street Land	102.4747	6451.31	62.9551	
360	6.0226			462.0409	0.00716	139.5808	13416	96.1131	
180	10.9575	0.1660	0.00100	1004.52	0.00600	166.7916	21403	128.3236 151.794°	

1%			4 間	斷現金流	记量:複	利因子值		1%
	一次支付		等額系列支付				2	至差
	複利 F/P	現值 P/F	償債基金	複利 F/A	資本回收	現值 P/A	等差現值	等差年金系列
n	12/17/12	光阻 [/[A/F	极利17/1	A/P	况值1/八	P/G	A/G
1	1.0100	0.9901	1.00000	1.0000	1.01000	0.9901		
2	1.0201	0.9803	0.49751	2.0100	0.50751	1.9704	0.9803	0.4975
3	1.0303	0.9706	0.33002	3.0301	0.34002	2.9410	2.9215	0.9934
4	1.0406	0.9610	0.24628	4.0604	0.25628	3.9020	5.8044	1.4876
5	1.0510	0.9515	0.19604	5.1010	0.20604	4.8534	9.6103	1.9801
6	1.0615	0.9420	0.16255	6.1520	0.17255	5.7955	14.3205	2.4710
7	1.0721	0.9327	0.13863	7.2135	0.14863	6.7282	19.9168	2.9602
8	1.0829	0.9235	0.12069	8.2857	0.13069	7.6517	26.3812	3.4478
9	1.0937	0.9143	0.10674	9.3685	0.11674	8.5660	33.6959	3.9337
10	1.1046	0.9053	0.09558	10.4622	0.10558	9.4713	41.8435	4.4179
11	1.1157	0.8963	0.08645	11.5668	0.09645	10.3676	50.8067	4.9005
12	1.1268	0.8874	0.07885	12.6825	0.08885	11.2551	60.5687	5.3815
13	1.1381	0.8787	0.07241	13.8093	0.08241	12.1337	71.1126	5.8607
14	1.1495	0.8700	0.06690	14.9474	0.07690	13.0037	82.4221	6.3384
15	1.1610	0.8613	0.06212	16.0969	0.07212	13.8651	94.4810	6.8143
16	1.1726	0.8528	0.05794	17.2579	0.06794	14.7179	107.2734~	7.2886
17	1.1843	0.8444	0.05426	18.4304	0.06426	15.5623	120.7834	7.7613
18	1.1961	0.8360	0.05098	19.6147	0.06098	16.3983	134.9957	8.2323
19	1.2081	0.8277	0.04805	20.8109	0.05805	17.2260	149.8950	8.7017
20	1.2202	0.8195	0.04542	22.0190	0.05542	18.0456	165.4664	9.1694
21	1.2324	0.8114	0.04303	23.2392	0.05303	18.8570	181.6950	9.6354
22	1.2447	0.8034	0.04086	24.4716	0.05086	19.6604	198.5663	10.0998
23	1.2572	0.7954	0.03889	25.7163	0.04889	20.4558	216.0660	10.5626
24	1.2697	0.7876	0.03707	26.9735	0.04707	21.2434	234.1800	11.0237
25	1.2824	0.7798	0.03541	28.2432	0.04541	22.0232	252.8945	11.4831
26	1.2953	0.7720	0.03387	29.5256	0.04387	22.7952	272.1957	11.9409
27	1.3082	0.7644	0.03245	30.8209	0.04245	23.5596	292.0702	12.3971
28	1.3213	0.7568	0.03112	32.1291	0.04112	24.3164	312.5047	12.8516
29	1.3345	0.7493	0.02990	33.4504	0.03990	25.0658	333.4863	13.3044
30	1.3478	0.7419	0.02875	34.7849	0.03875	25.8077	355.0021	13.7557
36	1.4308	0.6989	0.02321	43.0769	0.03321	30.1075	494.6207	16.4285
40	1.4889	0.9717	0.02046	48.8864	0.03046	32.8347	596.8561	18.1776
48	1.6122	0.6203	0.01633	61.2226	0.02633	37.9740	820.1460	21.5976
50	1.6446	0.6080	0.01551	64.4632	0.02551	39.1961	879.4176	22.4363
52	1.6777	0.5961	0.01476	67.7689	0.02476	40.3942	939.9175	23.2686
55	1.7285	0.5785	0.01373	72.8525	0.02373	42.1472	1032.81	24.5049
60	1.8167	0.5504	0.01224	81.6697	0.02224	44.9550	1192.81	26.5333
72	2.0471	0.4885	0.00955	104.7099	0.01955	51.1504	1597.87	31.2386
75	2.1091	0.4741	0.00902	110.9128	0.01902	52.5871	1702.73	32.3793
84	2.3067	0.4335	0.00765	130.6723	0.01765	56.6485	2023.32	35.7170
90	2.4486	0.4084	0.00690	144.8633	0.01690	59.1609	2240.57	37.8724
96	2.5993	0.3847	0.00625	159.9273	0.01625	61.5277	2459.43	39.9727
100	2.7048	0.3697	0.00587	170.4814	0.01587	63.0259	2605.78	41.3426
108	2.9289	0.3414	0.00518	192.8926	0.01518	65.8578	2898.42	44.0103
120	3.3004	0.3030	0.00435	230.0387	0.01435	69.7005	3334.11	47.8349
132	3.7190	0.2689	0.00368	271.8959	0.01368	73.1108	3761.69	51.4520
144	4.1906	0.2386	0.00313	319.0616	0.01313	76.1372	4177.47	54.8676
240	10.8926	0.0918	0.00101	989.2554	0.01101	90.8194	6878.60	75.7393
360	35.9496	0.0278	0.00029	3494.96	0.01029	97.2183	8720.43	89.6995
480	118.6477	0.0084	0.00008	11765	0.01008	99.1572	9511.16	95.9200

6%				間斷現金	流量:核	夏利因子	值	°6%.
	一次支付		等額系列支付				2	等差
	複利 F/P	現值 P/F	賃債基金	複利 F/A	資本回收	現值 P/A	等差現值	等差年金系列
n	1.0000	0.0101	A/F		A/P	770 122 - 772	P/G	A/G
2	1.0600	0.9434	1.00000	1.0000	1.06000	0.9434		
3	1.1236	0.8900	0.48544	2.0600	0.54544	1.8334	0.8900	0.4854
4	1.1910	0.8396	0.31411	3.1836	0.37411	2.6730	2.5692	0.9612
5	1.2625	0.7921	0.22859	4.3746	0.28859	3.4651	4.9455	1.4272
6	1.3382	0.7473	0.17740	5.6371	0.23740	4.2124	7.9345	1.8836
7	1.5036	0.7050	0.14336	6.9753	0.20336	4.9173	11.4594	2.3304
8	1.5938	0.6651	0.11914	8.3938	0.17914	5.5824	15.4497	2.7676
9	1.6895	0.5919	0.10104 0.08702	9.8975	0.16104	6.2098	19.8416	3.1952
10	1.7908	0.5584	0.08702	11.4913	0.14702	6.8017	24.5768	3.6133
11	1.8983	0.5268	0.06679	14.9716	0.13587 0.12679	7.3601	29.6023	4.0220
12	2.0122	0.4970	0.05928	16.8699	0.12079	7.8869	34.8702	4.4213
13	2.1329	0.4688	0.05296	18.8821	0.11296	8.3838 8.8527	40.3369	4.8113
14	2.2609	0.4423	0.04758	21.0151	0.10758	9.2950	45.9629	5.1920
15	2.3966	0.4173	0.04296	23.2760	0.10296	9.7122	57.5546	5.5635
16	2.5404	0.3936	0.03895	25.6725	0.09895	10.1059	57.5546 63.4592	5.9260
17	2.6928	0.3714	0.03544	28.2129	0.09544	10.4773	69.4011	6.2794
18	2.8543	0.3503	0.03236	30.9057	0.09236	10.8276	75.3569	6.6240
19	3.0256	0.3305	0.02962	33.7600	0.08962	11.1581	81.3062	6.9597
20	3.2071	0.3118	0.02718	36.7856	0.08718	11.4699	87.2304	7.2867
21	3.3996	0.2942	0.02500	39.9927	0.08500	11.7641	93.1136	7.6051
22	3.6035	0.2775	0.02305	43.3923	0.08305	12.0416	98.9412	7.9151
23	3.8197	0.2618	0.02128	46.9958	0.08128	12.3034	104.7007	8.2166
24	4.0489	0.2470	0.01968	50.8156	0.07968	12.5504	110.3812	8.5099 8.7951
25	4.2919	0.2330	0.01823	54.8645	0.07823	12.7834	115.9732	9.0722
26	4.5494	0.2198	0.01690	59.1564	0.07690	13.0032	121.4684	9.3414
27	4.8223	0.2074	0.01570	63.7058	0.07570	13.2105	126.8600	9.6029
28	5.1117	0.1956	0.01459	68.5281	0.07459	13.4062	132.1420	9.8568
29	5.4184	0.1846	0.01358	73.6398	0.07358	13.5907	137.3096	10.1032
30	5.7435	0.1741	0.01265	79.0582	0.07265	13.7648	142.3588	10.3422
31	6.0881	0.1643	0.01179	84.8017	0.07179	13.9291	147.2864	10.5740
32	6.4534	0.1550	0.01100	90.8898	0.07100	14.0840	152.0901	10.7988
33	6.8406	0.1462	0.01027	97.3432	0.07027	14.2302	156.7681	1 1.0166
34	7.2510	0.1379	0.00960	104.1838	0.06960	14.3681	161.3192	1 1.2276
35	7.6861	0.1301	0.00897	II1.4348	0.06897	14.4982	165.7427	1 1.4319
40	10.2857	0.0972	0.00646	154.7620	0.06646	15.0463	185.9568	1 2.3590
45	13.7646	0.0727	0.00470	212.7435	0.06470	15.4558	203.1096	13.1413
50	18.4202	0.0543	0.00344	290.3359	0.06344	15.7619	217.4574	13.7964
55	24.6503	0.0406	0.00254	394.1720	0.06254	15.9905	229.3222	14.3411
60	32.9877	0.0303	0.00188	533.1282	0.06188	16.1614	239.0428	14.7909
65	44.1450	0.0227	0.00139	719.0829	0.06139	16.2891	246.9450	15.1601
70	59.0759	0.0159	0.00103	967.9322	0.06103	16.3845	253.3271	15.4613
75	79.0569	0.0126	0.00077	1300.95	0.06077	16.4558	258.4527	15.7058
80	105.7960	0.0095	0.00057	1746.60	0.06057	16.5091	262.5493	15.9033
85	141.5789	0.0071	0.00043	2342.98	0.06043	16.5489	265.8096	16.0620
90	189.4645	0.0053	0.00032	3141.08	0.06032	16.5787	268.3946	16.1891
95	253.5463	0.0039	0.00024	4209.10	0.06024	16.6009	270.4375	16.2905
96	268.7590	0.0037	0.00022	4462.65	0.06022	16.6047	270.7909	16.3081
98	301.9776	0.0033	0.00020	5016.29	0.06020	16.6115	271.4491	16.3411
100	339.3021	0.0029	0.00018	5638.37	0.06018	16.6175	272.0471	16.3711

12%				間斷現金	流量:複	2利因子(直	12%	
	一次	支付	等額系列支付				等差		
	複利 F/P	現值 P/F	償債基金 A/F	複利 F/A	資本回收 A/P	現值 P/A	等差現值 P/G	等差年金系列 A/G	
<u>n</u>	1.1200	0.8929		1.0000	1.12000	0.8929	119	- ArG	
2	1.2544		1.00000		CONTROL OF THE PARTY OF THE PAR	1.6901	0.7972	0.4717	
3	1.4049	0.7972	0.47170	2.1200	0.59170	2.4018	2.2208		
4	1.5735	0.7118	0.29635	3.3744	0.41635	3.0373	4.1273	0.9246	
5	1.7623	0.6355	0.20923	4.7793	0.32923			1.3589	
6	1.9738	0.5674	0.15741	6.3528	0.27741	3.6048	6.3970	1.7746	
7	2.2107	0.5066	0.12323	8.1152	0.24323	4.1114	8.9302	2.1720	
8	2.4760	0.4523	0.09912	10.0890	0.21912	4.5638	11.6443	2.5512	
9	2.7731	0.4039	0.08130	12.2997	0.20130	4.9676	14.4714	2.9131	
10.	3.1058	0.3606	0.06768	14.7757	0.18768	5.3282	17.3563	3.2574	
11	3.4785	0.3220	0.05698	17.5487	0.17698	5.6502	20.2541	3.5847	
12	3.8960	0.2875	0.04842	20.6546	0.16842	5.9377	23.1288	3.8953	
13	4.3635	0.2567	0.04144	24.1331	0.16144	6.1944	25.9523	4.1897	
14	4.8871	0.2292	0.03568	28.0291	0.15568	6.4235	28.7024	4.4683	
15	5.4736	0.2046	0.03087	32.3926	0.15087	6.6282	31.3624	4.7317	
16	6.1304	0.1827	0.02682	37.2797	0.14682	6.8109	33.9202	4.9803	
		0.1631	0.02339	42.7533	0.14339	6.9740	36.3670	5.2147	
17	6.8660	0.1456	0.02046	48.8837	0.14046	7.1196	38.6973	5.4353	
18	7.6900	0.1300	0.01794	55.7497	0.13794	7.2497	40.9080	5.6427	
19	8.6128	0.1161	0.01576	63.4397	0.13576	7.3658	42.9979	5.8375	
20	9.6463	0.1037	0.01388	72.0524	0.13388	7.4694	44.9676	6.0202	
21	10.8038	0.0926	0.02334	81.6987	0.13224	7.5620	46.8188	6.1913	
22	12.1003 -	0.0826	0.01081	92.5026	0.13081	7.6446	48,5543	6.3514	
23	13.5523	0.0738	0.00956	104.6029	0.12956	7.7184	50.1776	6.5010	
24	15.1786	0.0659	0.00846	118.1552	0.12846	7.7843	51,6929	6.6406	
25	17.0001	0.0588	0.0750	133.3339	0.12750	7.8431	53.1046	6.7708	
26	19.0401	0.0525	0.00665	150.3339	0.12665	7.8957	54.4177	6.8921	
27	21.3249	0.0469	0.00590	169.3740	0.12590	7.9426	55.6369	7.0049	
28	23.8839	0.0419	0.00524	190.6989	0.12524	7.9844	56.7674	7.1098	
29	26.7499	0.0374	0.00466	214.5828	0.12466	8.0218	57.8141	7.2071	
30	29.9599	0.0334	0.00414	241.3327	0.12414	8.0552	58.7821	7.2974	
31	33.5551	0.0298	0.00369	271.2926	0.12369	8.0850	59.6761	7.3811	
32	37.5817	0.0266	0.00328	304.8477	0.12328	8.1116	60.5010	7.4586	
33	42.0915	0.0238	0.00292	342.4294	0.12292	8.1354	61.2612	7.5302	
34	47.1425	0.0212	0.00260	384.5210	0.12260	8.1566	61.9612	7.5965	
35	52.7996	0.0189	0.00232	431.6635	0.12232	8.1755	62.6052	7.6577	
40	93.0510	0.0107	0.00130	767.0914	0.12130	8.2438	65.1159	7.8988	
45	163.9876	0.0061	0.0074	1358.23	0.12074	8.2825	66.7342	8.0572	
50	289.0022	0.0035	0.00042	2400.02	0.12042	8.3045	67.7624	8.1597	
55	509.3206	0.0020	0.00024	4236.01	0.12024	8.3170	68.4082	8.2251	
60	897.5969	0.0011	0.0013	7471.64	0.12013	8.3240	68.8100	8.2664	
65	1581.87	0.0006	0.00008	13174	0.12008	8.3281	69.0581	8.2922	
70	2787.80	0.0004	0.00004	23223	0.12004	8.3303	69.2103	8.3082	
75	4913.06	0.0002	0.00002	40934	0.12002	8.3316	69.3031	8.3181	
80	8658.48	0.0001	0.00001	72146	0.12001	8.3324	69.3594	8.3241	
85	15259	0.0001	0.00001		0.12001	8.3328	69.3935	8.3278	