

ACC206 Week Five Problems

Please complete the following 5 exercises below in either Excel or a word document (but must be single document). You must show your work where appropriate (leaving the calculations within Excel cells is acceptable). Save the document, and submit it in the appropriate week using the Assignment Submission button.

1. Basic present value calculations

Calculate the present value of the following cash flows, rounding to the nearest dollar:

- A single cash inflow of \$12,000 in five years, discounted at a 12% rate of return.
 - An annual receipt of \$16,000 over the next 12 years, discounted at a 14% rate of return.
 - A single receipt of \$15,000 at the end of Year 1 followed by a single receipt of \$10,000 at the end of Year 4.
 - The company has a 10% rate of return.
 - An annual receipt of \$8,000 for three years followed by a single receipt of \$10,000 at the end of Year 4.
- The company has a 16% rate of return.

2. Cash flow calculations and net present value

On January 2, 20X1, Bruce Greene invested \$10,000 in the stock market and purchased 500 shares of Heartland Development, Inc. Heartland paid cash dividends of \$2.60 per share in 20X1 and 20X2; the dividend was raised to \$3.10 per share in 20X3. On December 31, 20X3, Greene sold his holdings and generated proceeds of \$13,000. Greene uses the net-present-value method and desires a 16% return on investments.

- Prepare a chronological list of the investment's cash flows. *Note:* Greene is entitled to the 20X3 dividend.
- Compute the investment's net present value, rounding calculations to the nearest dollar.
- Given the results of part (b), should Greene have acquired the Heartland stock? Briefly explain.

3. Straightforward net present value and internal rate of return

The City of Bedford is studying a 600-acre site on Route 356 for a new landfill. The startup cost has been calculated as follows:

Purchase cost: \$450 per acre

Site preparation: \$175,000

The site can be used for 20 years before it reaches capacity. Bedford, which shares a facility in Bath Township with other municipalities, estimates that the new location will save \$40,000 in annual operating costs.

- Should the landfill be acquired if Bedford desires an 8% return on its investment? Use the net-present-value method to determine your answer.

4. Straightforward net-present-value and payback computations

STL Entertainment is considering the acquisition of a sight-seeing boat for summer tours along the Mississippi River. The following information is available:

Cost of boat	\$500,000
Service life	10 summer seasons
Disposal value at the end of 10 seasons	\$100,000
Capacity per trip	300 passengers
Fixed operating costs per season (including straight-line depreciation)	\$160,000
Variable operating costs per trip	\$1,000
Ticket price	\$5 per passenger

All operating costs, except depreciation, require cash outlays. On the basis of similar operations in other parts of the country, management anticipates that each trip will be sold out and that 120,000 passengers will be carried each season. Ignore income taxes.

Instructions:

By using the net-present-value method, determine whether STL Entertainment should acquire the boat. Assume a 14% desired return on all investments- round calculations to the nearest dollar.

5. Equipment replacement decision

Columbia Enterprises is studying the replacement of some equipment that originally cost \$74,000. The equipment is expected to provide six more years of service if \$8,700 of major repairs are performed in two years. Annual cash operating costs total \$27,200. Columbia can sell the equipment now for \$36,000; the estimated residual value in six years is \$5,000.

New equipment is available that will reduce annual cash operating costs to \$21,000. The equipment costs \$103,000, has a service life of six years, and has an estimated residual value of \$13,000. Company sales will total \$430,000 per year with either the existing or the new equipment. Columbia has a minimum desired return of 12% and depreciates all equipment by the straight-line method.

Instructions:

- By using the net-present-value method, determine whether Columbia should keep its present equipment or acquire the new equipment. Round all calculations to the nearest dollar, and ignore income taxes.
- Columbia's management feels that the time value of money should be considered in all long-term decisions. Briefly discuss the rationale that underlies management's belief.

Appendix A

Future value interest factor of \$1 per period at i% for n periods, FVIF(i,n).											
Periods	RATE PER PERIOD										
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	
1	1.010	1.020	1.030	1.040	1.050	1.060	1.070	1.080	1.090	1.100	
2	1.020	1.040	1.061	1.082	1.103	1.124	1.145	1.166	1.188	1.210	
3	1.030	1.061	1.093	1.125	1.158	1.191	1.225	1.260	1.295	1.331	
4	1.041	1.082	1.126	1.170	1.216	1.262	1.311	1.360	1.412	1.464	
5	1.051	1.104	1.159	1.217	1.276	1.338	1.403	1.469	1.539	1.611	
6	1.062	1.126	1.194	1.265	1.340	1.419	1.501	1.587	1.677	1.772	
7	1.072	1.149	1.230	1.315	1.407	1.504	1.606	1.714	1.828	1.949	
8	1.083	1.172	1.267	1.369	1.477	1.594	1.718	1.851	1.993	2.144	
9	1.094	1.195	1.305	1.423	1.551	1.689	1.838	1.999	2.172	2.358	
10	1.105	1.219	1.344	1.480	1.629	1.791	1.967	2.159	2.367	2.594	
11	1.116	1.243	1.384	1.539	1.710	1.898	2.105	2.332	2.580	2.853	
12	1.127	1.268	1.426	1.601	1.796	2.012	2.252	2.518	2.813	3.138	
13	1.138	1.294	1.469	1.665	1.886	2.133	2.410	2.720	3.066	3.452	
14	1.149	1.319	1.513	1.732	1.980	2.261	2.579	2.937	3.342	3.797	
15	1.161	1.346	1.558	1.801	2.079	2.397	2.759	3.172	3.642	4.177	
16	1.173	1.373	1.605	1.873	2.183	2.540	2.952	3.426	3.970	4.595	
17	1.184	1.400	1.653	1.948	2.292	2.693	3.159	3.700	4.328	5.054	
18	1.196	1.428	1.702	2.026	2.407	2.854	3.380	3.996	4.717	5.560	
19	1.208	1.457	1.754	2.107	2.527	3.026	3.617	4.316	5.142	6.116	
20	1.220	1.486	1.806	2.191	2.653	3.207	3.870	4.661	5.604	6.727	
25	1.282	1.641	2.094	2.666	3.386	4.292	5.427	6.848	8.623	10.835	
30	1.348	1.811	2.427	3.243	4.322	5.743	7.612	10.063	13.268	17.449	
35	1.417	2.000	2.814	3.946	5.516	7.686	10.677	14.785	20.414	28.102	
40	1.489	2.208	3.262	4.801	7.040	10.286	14.974	21.725	31.409	45.259	
50	1.645	2.692	4.384	7.107	11.467	18.420	29.457	46.902	74.358	117.391	

Future value interest factor of \$1 per period at i% for n periods, FVIF(i,n).												
Periods	RATE PER PERIOD											
	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%		
1	1.110	1.120	1.130	1.140	1.150	1.160	1.170	1.180	1.190	1.200		
2	1.232	1.254	1.277	1.300	1.323	1.346	1.369	1.392	1.416	1.440		
3	1.368	1.405	1.443	1.482	1.521	1.561	1.602	1.643	1.685	1.728		
4	1.518	1.574	1.630	1.689	1.749	1.811	1.874	1.939	2.005	2.074		
5	1.685	1.762	1.842	1.925	2.011	2.100	2.192	2.288	2.386	2.488		
6	1.870	1.974	2.082	2.195	2.313	2.436	2.565	2.700	2.840	2.986		
7	2.076	2.211	2.353	2.502	2.660	2.826	3.001	3.185	3.379	3.583		
8	2.305	2.476	2.658	2.853	3.059	3.278	3.511	3.759	4.021	4.300		
9	2.558	2.773	3.004	3.252	3.518	3.803	4.108	4.435	4.785	5.160		
10	2.839	3.106	3.395	3.707	4.046	4.411	4.807	5.234	5.695	6.192		
11	3.152	3.479	3.836	4.226	4.652	5.117	5.624	6.176	6.777	7.430		
12	3.498	3.896	4.335	4.818	5.350	5.936	6.580	7.288	8.064	8.916		
13	3.883	4.363	4.898	5.492	6.153	6.886	7.699	8.599	9.596	10.699		
14	4.310	4.887	5.535	6.261	7.076	7.988	9.007	10.147	11.420	12.839		
15	4.785	5.474	6.254	7.138	8.137	9.266	10.539	11.974	13.590	15.407		
16	5.311	6.130	7.067	8.137	9.358	10.748	12.330	14.129	16.172	18.488		
17	5.895	6.866	7.986	9.276	10.761	12.468	14.426	16.672	19.244	22.186		
18	6.544	7.690	9.024	10.575	12.375	14.463	16.879	19.673	22.901	26.623		
19	7.263	8.613	10.197	12.056	14.232	16.777	19.748	23.214	27.252	31.948		
20	8.062	9.646	11.523	13.743	16.367	19.461	23.106	27.393	32.429	38.338		
25	13.585	17.000	21.231	26.482	32.919	40.874	50.658	62.669	77.388	95.396		
30	22.892	29.960	39.116	50.950	66.212	85.850	111.065	143.371	184.675	237.376		
35	38.575	52.800	72.069	98.100	133.176	180.314	243.503	327.987	440.701	590.668		
40	65.001	93.051	132.782	188.884	267.884	378.721	533.869	750.378	1,051.668	1,469.772		
50	184.565	289.002	450.736	700.233	1,083.657	1,670.704	2,566.215	3,927.357	5,988.914	9,100.438		

Appendix C

Present value interest factor of \$1 per period at 1% for n periods, PVIF(i,n).

Periods	RATE PER PERIOD																			
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065
16	0.853	0.728	0.623	0.534	0.458	0.394	0.339	0.292	0.252	0.218	0.188	0.163	0.141	0.123	0.107	0.093	0.081	0.071	0.062	0.054
17	0.844	0.714	0.605	0.513	0.436	0.371	0.317	0.270	0.231	0.198	0.170	0.146	0.125	0.108	0.093	0.080	0.069	0.060	0.052	0.045
18	0.836	0.700	0.587	0.494	0.416	0.350	0.296	0.250	0.212	0.180	0.153	0.130	0.111	0.095	0.081	0.069	0.059	0.051	0.044	0.038
19	0.828	0.686	0.570	0.475	0.396	0.331	0.277	0.232	0.194	0.164	0.138	0.116	0.098	0.083	0.070	0.060	0.051	0.043	0.037	0.031
20	0.820	0.673	0.554	0.456	0.377	0.312	0.258	0.215	0.178	0.149	0.124	0.104	0.087	0.073	0.061	0.051	0.043	0.037	0.031	0.026
25	0.780	0.610	0.478	0.375	0.295	0.233	0.184	0.146	0.116	0.092	0.074	0.059	0.047	0.038	0.030	0.024	0.020	0.016	0.013	0.010
30	0.742	0.552	0.412	0.308	0.231	0.174	0.131	0.099	0.075	0.057	0.044	0.033	0.026	0.020	0.015	0.012	0.009	0.007	0.005	0.004
35	0.706	0.500	0.355	0.253	0.181	0.130	0.094	0.068	0.049	0.036	0.026	0.019	0.014	0.010	0.008	0.006	0.004	0.003	0.002	0.002
40	0.672	0.453	0.307	0.208	0.142	0.097	0.067	0.046	0.032	0.022	0.015	0.011	0.008	0.005	0.004	0.003	0.002	0.001	0.001	0.001
50	0.608	0.372	0.228	0.141	0.087	0.054	0.034	0.021	0.013	0.009	0.005	0.003	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000

Appendix D

Present value interest factor of an (ordinary) annuity of \$1 per period at i% for n periods, PVIFA(i,n).																				
Periods	Rate per period																			
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991
6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326
7	6.728	6.472	6.230	6.002	5.796	5.582	5.389	5.206	5.033	4.868	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837
9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031
10	9.471	8.993	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192
11	10.368	9.787	9.253	8.760	8.306	7.887	7.499	7.138	6.805	6.495	6.207	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327
12	11.255	10.575	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814	6.482	6.194	5.918	5.660	5.421	5.197	4.988	4.793	4.611	4.439
13	12.134	11.348	10.635	9.986	9.394	8.853	8.358	7.904	7.487	7.103	6.750	6.424	6.122	5.842	5.583	5.342	5.118	4.910	4.715	4.533
14	13.004	12.106	11.296	10.563	9.899	9.295	8.745	8.244	7.786	7.367	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611
15	13.865	12.849	11.938	11.118	10.380	9.712	9.108	8.559	8.061	7.606	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675
16	14.718	13.578	12.561	11.652	10.838	10.106	9.447	8.851	8.313	7.824	7.379	6.974	6.604	6.265	5.954	5.668	5.405	5.162	4.938	4.730
17	15.562	14.292	13.166	12.166	11.274	10.477	9.763	9.122	8.544	8.022	7.549	7.120	6.729	6.373	6.047	5.749	5.475	5.222	4.990	4.775
18	16.398	14.992	13.754	12.659	11.690	10.828	10.059	9.372	8.756	8.201	7.702	7.250	6.840	6.467	6.128	5.818	5.534	5.273	5.033	4.812
19	17.226	15.678	14.324	13.134	12.085	11.158	10.336	9.604	8.950	8.365	7.839	7.366	6.938	6.550	6.198	5.877	5.584	5.316	5.070	4.843
20	18.046	16.351	14.877	13.590	12.462	11.470	10.594	9.818	9.129	8.514	7.953	7.469	7.025	6.623	6.259	5.929	5.628	5.353	5.101	4.870
25	22.023	19.523	17.413	15.622	14.094	12.763	11.654	10.675	9.823	9.077	8.422	7.843	7.330	6.873	6.464	6.097	5.766	5.457	5.185	4.948
30	26.808	22.396	19.600	17.292	15.372	13.765	12.409	11.258	10.274	9.427	8.694	8.055	7.496	7.003	6.566	6.177	5.829	5.517	5.235	4.979
35	29.409	24.999	21.487	18.665	16.374	14.498	12.948	11.655	10.567	9.644	8.855	8.176	7.586	7.070	6.617	6.215	5.858	5.539	5.251	4.992
40	32.835	27.355	23.115	19.793	17.159	15.046	13.332	11.925	10.767	9.779	8.951	8.244	7.634	7.105	6.642	6.233	5.871	5.548	5.258	4.997
50	39.196	31.424	25.730	21.482	18.256	15.762	13.801	12.293	10.962	9.915	9.042	8.304	7.675	7.133	6.661	6.246	5.880	5.554	5.262	4.998