

CEL 464		Construction Contract and Economics	MINOR II	
Time allowed	1 hour 8:00-9:00		Maximum Marks	25
Venue	VI 301		Date	9.10.2014

Question 1 (7 marks)

An investment proposal requires an immediate payment of Rs. 25 Lakhs and is expected to provide an annual return of Rs. 9 Lakhs for each of the next 6 years. Assuming that the annual return given above is independent from year to year and has a standard deviation of Rs. 1.5 Lakhs.

(i) Determine the expected value and the standard deviation of the PW for this investment, using an interest rate of 20%.

(ii) Determine the probability that the investment will result in a rate of return below a MARR of 20% if the annual cash flows are expected to be normally distributed.

Question 2 (8 marks)

An investment is being considered that requires Rs. 10 Lakh and commits the money for 10 years. During that period it is equally likely that the annual returns from the investment will be Rs. 100,000, Rs. 150,000, and Rs. 200,000. The probability is 0.75 that the salvage value will be Rs. 300,000, but there is 1 chance in 4 that it will be zero. A minimum rate of return of 10% is expected.

Construct an investment risk profile for the proposal on a chart in which the horizontal axis registers the net PW and the vertical axis is a probability scale ranging from 0 to 1. Draw the curve to show the probability of returns equal or less than the scaled PWs.

Question 3 (10 marks)

Consider the following two alternatives

	Alternative 1	Alternative 2
Purchase cost of Asset at $t=0$	Rs. 1000,000	Rs. 800,000
Annual expense	Rs. 250,000	Rs. 150,000
Annual income	Rs. 575,000	Rs. 575,000
Salvage value	Rs. 200,000	0
Economic life	8 years	4 years

Straight line method of depreciation is to be adopted. The tax rate is 40%. Analysis is to be done on post tax cash flows.

Suppose that the salvage value of alternative 2 is known with certainty. By how much would the estimate of salvage value for alternative 1 have to vary so that the initial decision based on the data above would be reversed? The minimum acceptable rate of return is 15 percent.

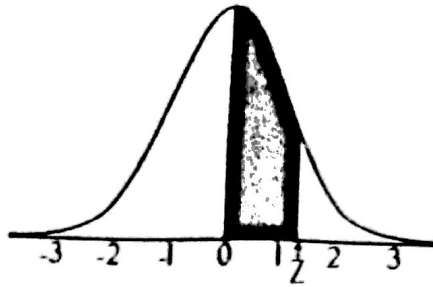
interest factors

$(P/F, 20\%, 1) = 0.8333$, $(P/F, 20\%, 2) = 0.6944$, $(P/F, 20\%, 3) = 0.5787$, $(P/F, 20\%, 4) = 0.4823$, $(P/F, 20\%, 5) = 0.4019$, $(P/F, 20\%, 6) = 0.3349$, $(P/F, 20\%, 7) = 0.2791$, $(P/F, 20\%, 8) = 0.2326$, $(P/F, 20\%, 9) = 0.1938$, $(P/F, 20\%, 10) = 0.1615$, $(P/F, 20\%, 11) = 0.1346$, $(P/F, 20\%, 12) = 0.1122$

$(P/A, 10\%, 10) = 6.1416$, and $(P/F, 10\%, 10) = 0.3855$.

$(P/A, 15\%, 8) = 4.4873$, $(P/F, 15\%, 8) = 0.3269$, $(P/F, 15\%, 4) = 0.5718$

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The following table can be used to find the area under the curve from the central line to any Z -value up to 3. To determine the area under the curve between 0 and 1.35, start at the row for 1.3, and read along until 1.35. The value corresponding to $Z = 1.35$ is 0.4115.

	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990