CAPITAL BUDGETING PRACTICE QUIZ

28. (Ignore income taxes in this problem.) The Baker Company purchased a piece of equipment with the following expected results:

Useful life	7 years
Yearly net cash inflow	$50,000
Salvage value	$0
Internal rate of return	20%
Discount rate	16%

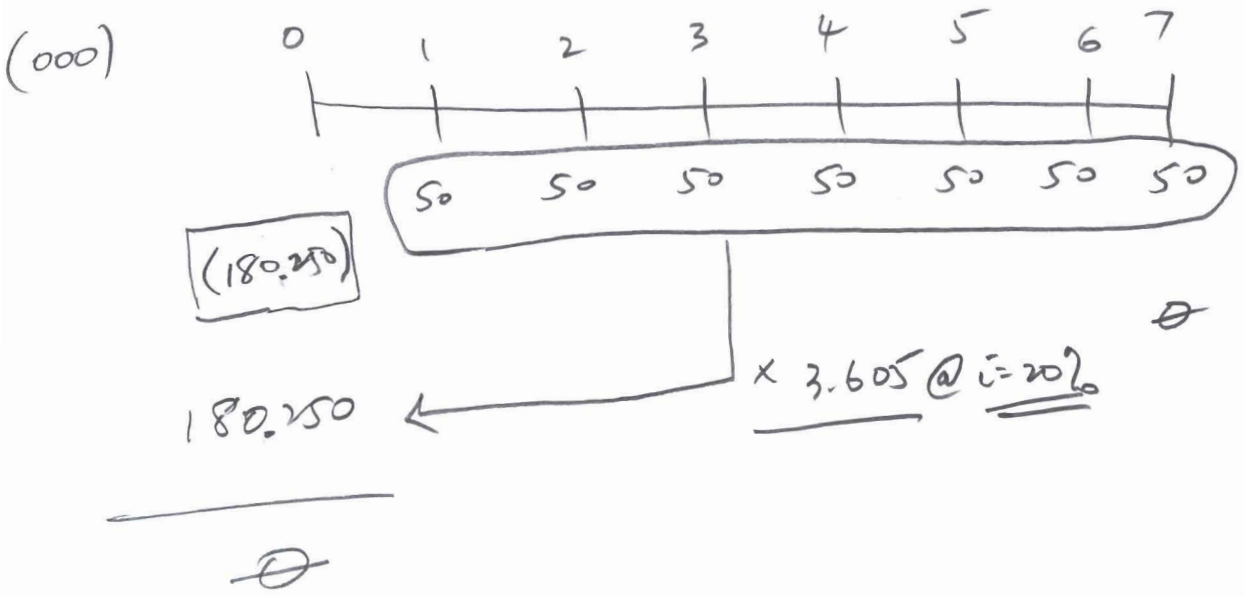
The initial cost of the equipment was:

A. $300,100

B. $180,250

C. $190,600

D. Cannot be determined from the given information.



i = 16%

IRR = 20%

Annuity factor = 3.605

n = 7

i = 20%

CAPITAL BUDGETING PRACTICE QUIZ

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Internal rate of return	20%
Discount rate	16%

The initial cost of the equipment was:
A. $300,100
B. $180,250
C. $190,600
D. Cannot be determined from the given information.

The internal rate of return is the rate of return at which the net present value of the project is zero.

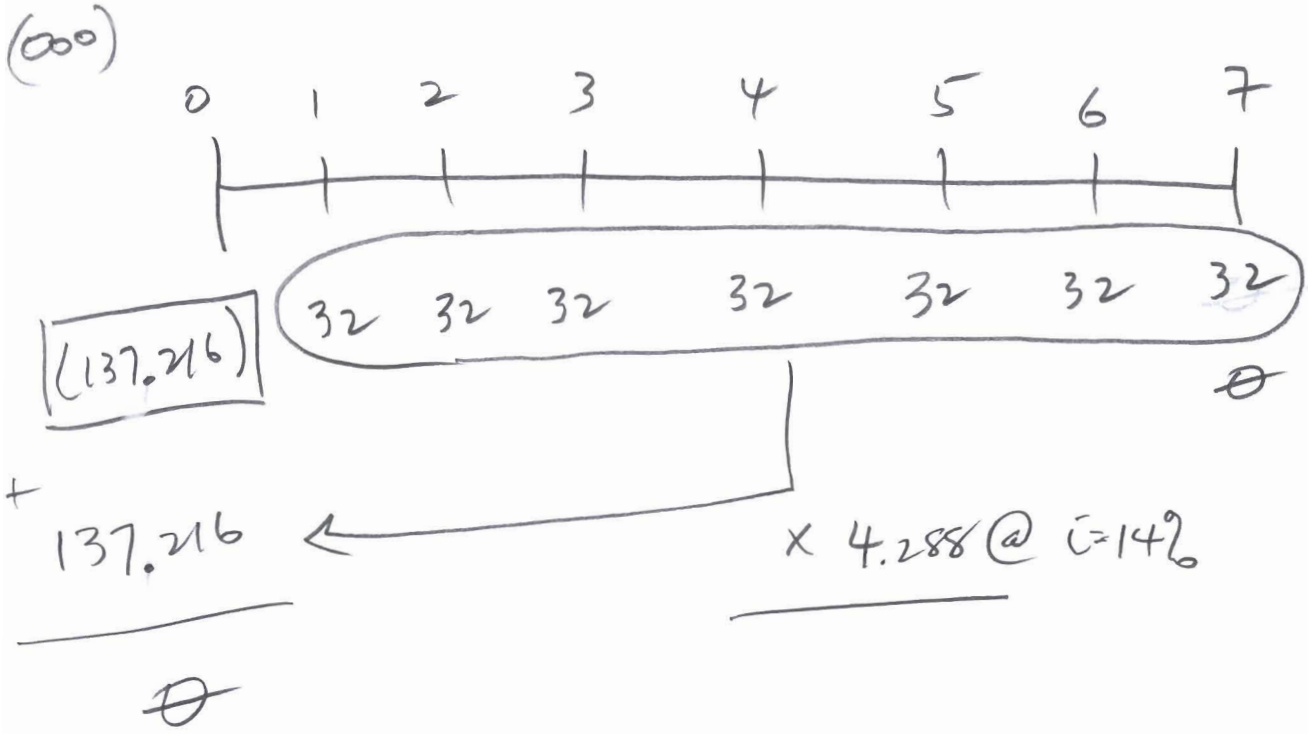
Item	Year(s)	Amount of Cash Flow	20% Factor	Present Value of Cash Flows
Initial investment	Now	(X)	1.000	(X)
Yearly net cash inflow	1-7	$50,000	3.605	$180,250
Net present value				$0

-X + $180,250 = $0
X = $180,250

AACSB: Analytic
AICPA BB: Critical Thinking
AICPA FN: Measurement
Bloom's: Application
Learning Objective: 13-01 Evaluate the acceptability of an investment project using the net present value method
Learning Objective: 13-02 Evaluate the acceptability of an investment project using the internal rate of return method
Level: Hard

29. (Ignore income taxes in this problem.) The Yates Company purchased a piece of equipment which is expected to have a useful life of 7 years with no salvage value at the end of the 7-year period. This equipment is expected to generate a cash inflow of $32,000 each year of its useful life. If this investment has a internal rate of return of 14%, then the initial cost of the equipment is:

A. $150,000
B. $137,216
C. $12,800
D. $343,360



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A. $150,000
B. $137,216
C. $12,800
D. $343,360

The internal rate of return is the rate of return at which the net present value of the project is zero.

Item	Year(s)	Amount of Cash Flow	14% Factor	Present Value of Cash Flows
Initial investment	Now	(X)	1.000	(X)
Yearly net cash inflow	1-7	$32,000	4.288	$137,216
Net present value				$0

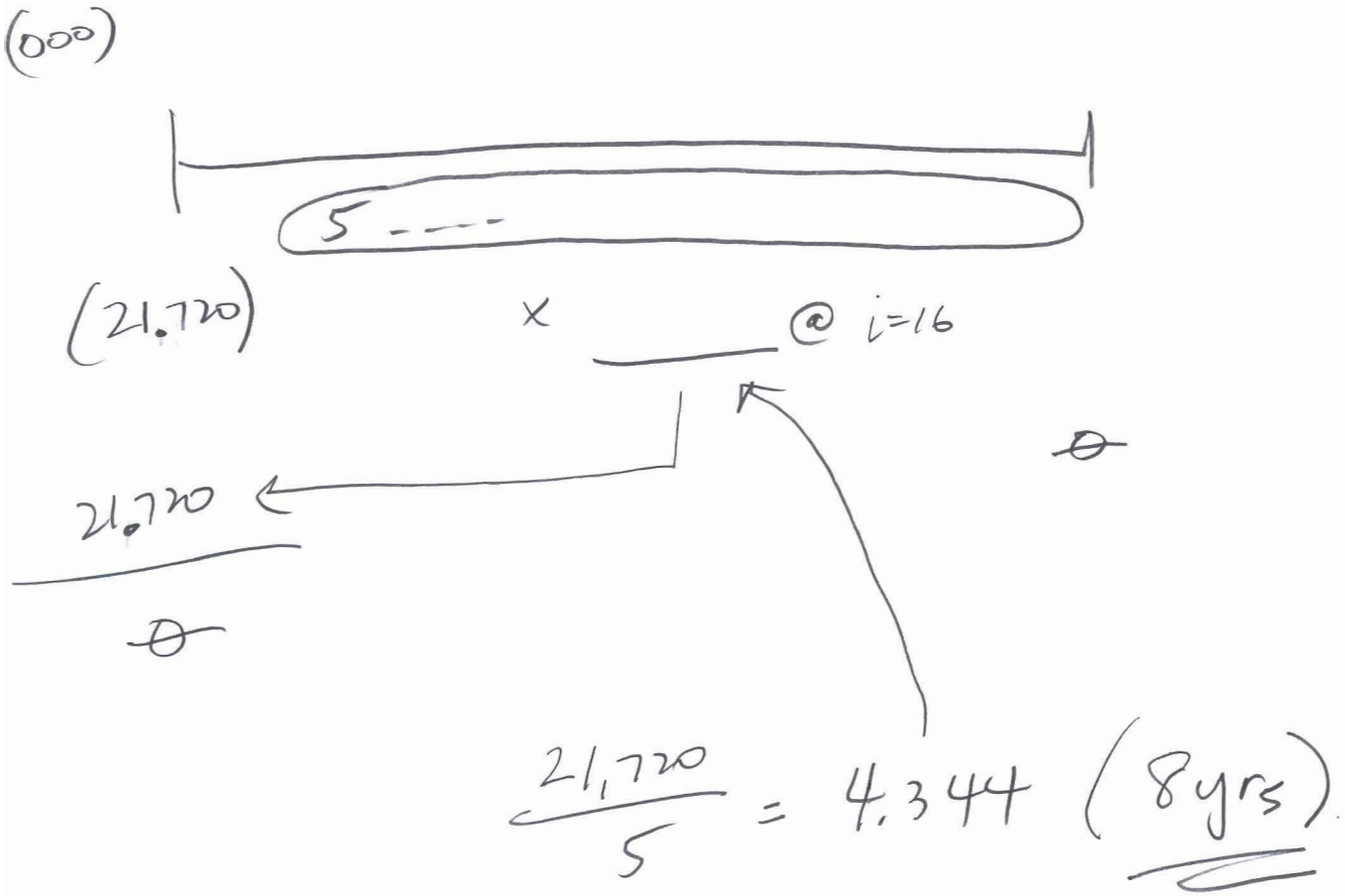
-X + $137,216 = $0
X = $137,216

AACSB: Analytic
AICPA BB: Critical Thinking
AICPA FN: Measurement
Bloom's: Application
Learning Objective: 13-01 Evaluate the acceptability of an investment project using the net present value method
Learning Objective: 13-02 Evaluate the acceptability of an investment project using the internal rate of return method
Level: Hard

30. (Ignore income taxes in this problem.) The following information is available on a new piece of equipment:

Cost of the equipment.....	$21,720
Salvage value.....	$0
Annual cash inflows.....	$5,000
Internal rate of return.....	16%
Required rate of return.....	10%

The life of the equipment is approximately:
A. 6 years
B. 4.3 years
C. 8 years
D. It is impossible to determine from the data given.



30. (Ignore income taxes in this problem.) The following information is available on a new piece of equipment:

Cost of the equipment.....	$21,720
Salvage value.....	$0
Annual cash inflows.....	$5,000
Internal rate of return.....	16%
Required rate of return.....	10%

The life of the equipment is approximately:
A. 6 years
B. 4.3 years
C. 8 years
D. It is impossible to determine from the data given.

Factor of the internal rate of return = Investment required ÷ Annual net cash inflow
= $21,720 ÷ $5,000
= 4.344
The factor of 4.344 for 8 years represents an internal rate of return of 16%.

AACSB: Analytic
AICPA BB: Critical Thinking
AICPA FN: Measurement
Bloom's: Application
Learning Objective: 13-01 Evaluate the acceptability of an investment project using the net present value method
Learning Objective: 13-02 Evaluate the acceptability of an investment project using the internal rate of return method
Level: Hard

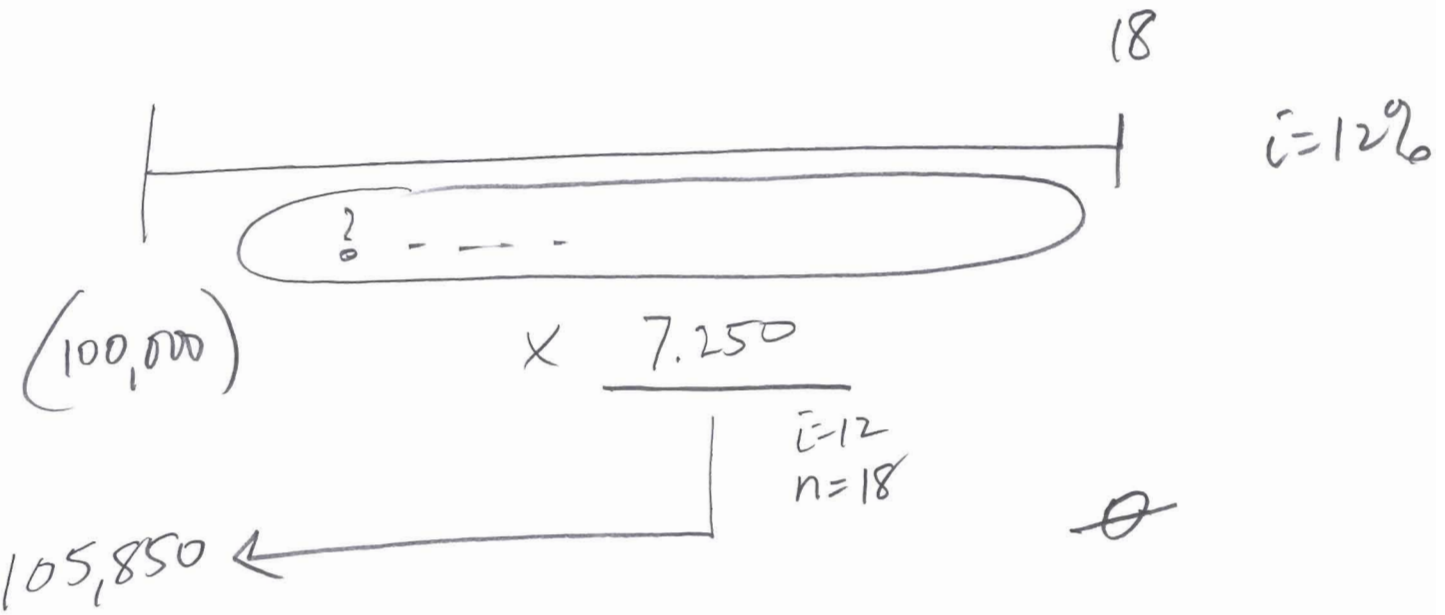
34. (Ignore income taxes in this problem.) Benz Company is considering the purchase of a machine that costs $100,000, has a useful life of 18 years, and no salvage value. The company's discount rate is 12%. If the machine's net present value is $5,850, then the annual cash inflows associated with the machine must be (round to the nearest whole dollar):

A. $42,413

B. $14,600

C. $13,760

D. It is impossible to determine from the data given.



5,850 = NPV

$\frac{105,850}{7.250} = 14,600/yr.$

34. (Ignore income taxes in this problem.) Benz Company is considering the purchase of a machine that costs $100,000, has a useful life of 18 years, and no salvage value. The company's discount rate is 12%. If the machine's net present value is $5,850, then the annual cash inflows associated with the machine must be (round to the nearest whole dollar):

A. $42,413
B. $14,600
C. $13,760
D. It is impossible to determine from the data given.

Item	Year(s)	Amount of Cash Flow	12% Factor	Present Value of Cash Flows
Initial investment	Now	$(100,000)	1.000	$(100,000)
Annual cash inflows	1-18	X	7.250	7.250X
Net present value				$5,850

-$100,000 + 7.250X = $5,850
7.250X = $100,000 + $5,850
X = ($100,000 + $5,850) ÷ 7.250 = $14,600

AACSB: Analytic
AICPA BB: Critical Thinking
AICPA FN: Measurement
Bloom's: Application
Learning Objective: 13-01 Evaluate the acceptability of an investment project using the net present value method
Level: Hard

$\frac{(70,000 - 0\text{ SV})}{7\text{ yrs}} = 10,000/\text{yr}$ SL depree. (noncash).

62. (Ignore income taxes in this problem.) The Jackson Company has invested in a machine that cost $70,000, that has a useful life of seven years, and that has no salvage value at the end of its useful life. The machine is being depreciated by the straight-line method, based on its useful life. It will have a payback period of four years. Given these data, the simple rate of return on the machine is closest to:

A. 7.1%
B. 8.2%
C. 10.7%
D. 39.3%

Simple rate of return = $\frac{\text{Annual Incremental NI } (17,500 - 10,000)}{\text{Initial Investment } 70,000} = 10.7\%$

Payback = $\frac{\text{Investment Required } 70,000}{\text{Annual Net Cash Inflow } 17,500} = 4\text{ yrs}$

62. (Ignore income taxes in this problem.) The Jackson Company has invested in a machine that cost $70,000, that has a useful life of seven years, and that has no salvage value at the end of its useful life. The machine is being depreciated by the straight-line method, based on its useful life. It will have a payback period of four years. Given these data, the simple rate of return on the machine is closest to:

A. 7.1%
B. 8.2%
C. 10.7%
D. 39.3%

Annual incremental cost savings*		$17,500
Annual incremental expenses:		
Annual depreciation ($70,000 – $0)/7	$10,000	10,000
Annual incremental net operating income		$7,500

*Payback period = Investment required ÷ Annual net cash inflow
4 years = $70,000 ÷ Annual net cash inflow
Annual net cash inflow = $70,000 ÷ 4 years = $17,500 yearly cash flow

Simple rate of return = Annual incremental net operating income ÷ Initial investment
= $7,500 ÷ $70,000 = 10.70%

AACSB: Analytic
AICPA BB: Critical Thinking
AICPA FN: Measurement
Bloom's: Application
Learning Objective: 13-05 Determine the payback period for an investment
Learning Objective: 13-06 Compute the simple rate of return for an investment
Level: Hard

$\frac{(180{,}000 - \text{SV})}{10 \text{ yrs.}} = 18{,}000/\text{yr.}$ SL Depr. (non-cash).

69. (Ignore income taxes in this problem.) Blaine Corporation is considering replacing a technologically obsolete machine with a new state-of-the-art numerically controlled machine. The new machine would cost $180,000 and would have a ten-year useful life. Unfortunately, the new machine would have no salvage value. The new machine would cost $12,000 per year to operate and maintain, but would save $48,000 per year in labor and other costs. The old machine can be sold now for scrap for $20,000. What is the simple rate of return on the new machine (round off your answer to the nearest one-hundredth of a percent)?

A. 10.00%
B. 26.67%
C. 22.50%
D. 11.25%

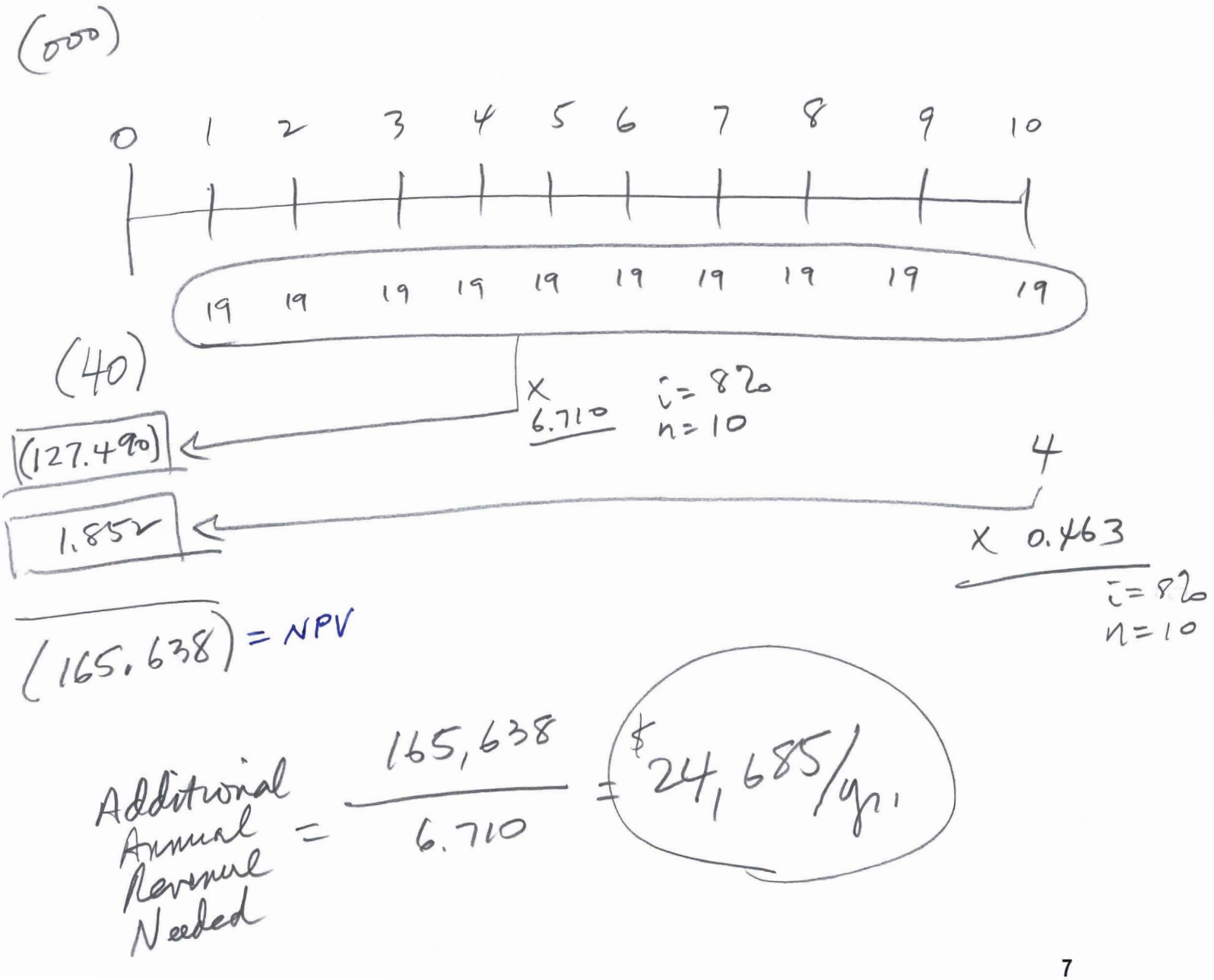
Simple Rate of Return $= \dfrac{\text{Annual Incremental NI}}{\text{Initial Investment}} = \dfrac{48{,}000 - 12{,}000 - 18{,}000}{180{,}000 - 20{,}000}$

$= 11.25\%$

136. (Ignore income taxes in this problem.) The management of an amusement park is considering purchasing a new ride for $40,000 that would have a useful life of 10 years and a salvage value of $4,000. The ride would require annual operating costs of $19,000 throughout its useful life. The company's discount rate is 8%. Management is unsure about how much additional ticket revenue the new ride would generate-particularly because customers pay a flat fee when they enter the park that entitles them to unlimited rides. Hopefully, the presence of the ride would attract new customers.

Required:

How much additional revenue would the ride have to generate per year to make it an attractive investment?



136. (Ignore income taxes in this problem.) The management of an amusement park is considering purchasing a new ride for $40,000 that would have a useful life of 10 years and a salvage value of $4,000. The ride would require annual operating costs of $19,000 throughout its useful life. The company's discount rate is 8%. Management is unsure about how much additional ticket revenue the new ride would generate-particularly because customers pay a flat fee when they enter the park that entitles them to unlimited rides. Hopefully, the presence of the ride would attract new customers.

Required:

How much additional revenue would the ride have to generate per year to make it an attractive investment?

Item	Year(s)	Amount of Cash Flow	8% Factor	Present Value of Cash Flows
Initial investment	Now	$(40,000)	1.000	$ (40,000)
Annual operating costs	1-10	$(19,000)	6.710	(127,490)
Salvage value	10	$4,000	0.463	1,852
Net present value				$(165,638)

Minimum annual cash flows required = Negative net present value to be offset ÷ Present value factor
$165,638 ÷ 6.710 = $24,685
This much additional revenue would result in a zero net present value. Any less than this and the net present value would be negative. Any more than this and the net present value would be positive.

AACSB: Analytic
AICPA BB: Critical Thinking
AICPA FN: Measurement
Bloom's: Application
Learning Objective: 13-03 Evaluate an investment project that has uncertain cash flows
Level: Hard

ANNUITY PV

Present Value of Annuity $1.00 in Arrears*

$$P_n = \frac{1}{r}\left[1 - \frac{1}{(1+r)^n}\right]$$

Periods	2%	4%	6%	8%	10%	12%	14%	16%	18%	20%	22%	24%	26%	28%	30%	32%	40%	Periods
1	0.980	0.962	0.943	0.926	0.909	0.893	0.877	0.862	0.847	0.833	0.820	0.806	0.794	0.781	0.769	0.758	0.714	1
2	1.942	1.886	1.833	1.783	1.736	1.690	1.647	1.605	1.566	1.528	1.492	1.457	1.424	1.392	1.361	1.331	1.224	2
3	2.884	2.775	2.673	2.577	2.487	2.402	2.322	2.246	2.174	2.106	2.042	1.981	1.923	1.868	1.816	1.766	1.589	3
4	3.808	3.630	3.465	3.312	3.170	3.037	2.914	2.798	2.690	2.589	2.494	2.404	2.320	2.241	2.166	2.096	1.849	4
5	4.713	4.452	4.212	3.993	3.791	3.605	3.433	3.274	3.127	2.991	2.864	2.745	2.635	2.532	2.436	2.345	2.035	5
6	5.601	5.242	4.917	4.623	4.355	4.111	3.889	3.685	3.498	3.326	3.167	3.020	2.885	2.759	2.643	2.534	2.168	6
7	6.472	6.002	5.582	5.206	4.868	4.564	4.288	4.039	3.812	3.605	3.416	3.242	3.083	2.937	2.802	2.677	2.263	7
8	7.325	6.733	6.210	5.747	5.335	4.968	4.639	4.344	4.078	3.837	3.619	3.421	3.241	3.076	2.925	2.786	2.331	8
9	8.162	7.435	6.802	6.247	5.759	5.328	4.946	4.607	4.303	4.031	3.786	3.566	3.366	3.184	3.019	2.868	2.379	9
10	8.983	8.111	7.360	6.710	6.145	5.650	5.216	4.833	4.494	4.192	3.923	3.682	3.465	3.269	3.092	2.930	2.414	10
11	9.787	8.760	7.887	7.139	6.495	5.938	5.453	5.029	4.656	4.327	4.035	3.776	3.543	3.335	3.147	2.978	2.438	11
12	10.575	9.385	8.384	7.536	6.814	6.194	5.660	5.197	4.793	4.439	4.127	3.851	3.606	3.387	3.190	3.013	2.456	12
13	11.348	9.986	8.853	7.904	7.103	6.424	5.842	5.342	4.910	4.533	4.203	3.912	3.656	3.427	3.223	3.040	2.469	13
14	12.106	10.563	9.295	8.244	7.367	6.628	6.002	5.468	5.008	4.611	4.265	3.962	3.695	3.459	3.249	3.061	2.478	14
15	12.849	11.118	9.712	8.559	7.606	6.811	6.142	5.575	5.092	4.675	4.315	4.001	3.726	3.483	3.268	3.076	2.484	15
16	13.578	11.652	10.106	8.851	7.824	6.974	6.265	5.668	5.162	4.730	4.357	4.033	3.751	3.503	3.283	3.088	2.489	16
17	14.292	12.166	10.477	9.122	8.022	7.120	6.373	5.749	5.222	4.775	4.391	4.059	3.771	3.518	3.295	3.097	2.492	17
18	14.992	12.659	10.828	9.372	8.201	7.250	6.467	5.818	5.273	4.812	4.419	4.080	3.786	3.529	3.304	3.104	2.494	18
19	15.678	13.134	11.158	9.604	8.365	7.366	6.550	5.877	5.316	4.843	4.442	4.097	3.799	3.539	3.311	3.109	2.496	19
20	16.351	13.590	11.470	9.818	8.514	7.469	6.623	5.929	5.353	4.870	4.460	4.110	3.808	3.546	3.316	3.113	2.497	20
21	17.011	14.029	11.764	10.017	8.649	7.562	6.687	5.973	5.384	4.891	4.476	4.121	3.816	3.551	3.320	3.116	2.498	21
22	17.658	14.451	12.042	10.201	8.772	7.645	6.743	6.011	5.410	4.909	4.488	4.130	3.822	3.556	3.323	3.118	2.498	22
23	18.292	14.857	12.303	10.371	8.883	7.718	6.792	6.044	5.432	4.925	4.499	4.137	3.827	3.559	3.325	3.120	2.499	23
24	18.914	15.247	12.550	10.529	8.985	7.784	6.835	6.073	5.451	4.937	4.507	4.143	3.831	3.562	3.327	3.121	2.499	24
25	19.523	15.622	12.783	10.675	9.077	7.843	6.873	6.097	5.467	4.948	4.514	4.147	3.834	3.564	3.329	3.122	2.499	25
26	20.121	15.983	13.003	10.810	9.161	7.896	6.906	6.118	5.480	4.956	4.520	4.151	3.837	3.566	3.330	3.123	2.500	26
27	20.707	16.330	13.211	10.935	9.237	7.943	6.935	6.136	5.492	4.964	4.524	4.154	3.839	3.567	3.331	3.123	2.500	27
28	21.281	16.663	13.406	11.051	9.307	7.984	6.961	6.152	5.502	4.970	4.528	4.157	3.840	3.568	3.331	3.124	2.500	28
29	21.844	16.984	13.591	11.158	9.370	8.022	6.983	6.166	5.510	4.975	4.531	4.159	3.841	3.569	3.332	3.124	2.500	29
30	22.396	17.292	13.765	11.258	9.427	8.055	7.003	6.177	5.517	4.979	4.534	4.160	3.842	3.569	3.332	3.124	2.500	30
35	24.999	18.665	14.498	11.655	9.644	8.176	7.070	6.215	5.539	4.992	4.541	4.164	3.845	3.571	3.333	3.125	2.500	35
40	27.355	19.793	15.046	11.925	9.779	8.244	7.105	6.233	5.548	4.997	4.544	4.166	3.846	3.571	3.333	3.125	2.500	40

*Payments (or receipts) at the end of each period.

Present Value of $1.00

$P = \frac{S}{(1 + r)^n}$. In this table $S = \$1.00$.

LUMP SUM PV

Periods	2%	4%	6%	8%	10%	12%	14%	16%	18%	20%	22%	24%	26%	28%	30%	32%	40%	Periods
1	0.980	0.962	0.943	0.926	0.909	0.893	0.877	0.862	0.847	0.833	0.820	0.806	0.794	0.781	0.769	0.758	0.714	1
2	0.961	0.925	0.890	0.857	0.826	0.797	0.769	0.743	0.718	0.694	0.672	0.650	0.630	0.610	0.592	0.574	0.510	2
3	0.942	0.889	0.840	0.794	0.751	0.712	0.675	0.641	0.609	0.579	0.551	0.524	0.500	0.477	0.455	0.435	0.364	3
4	0.924	0.855	0.792	0.735	0.683	0.636	0.592	0.552	0.516	0.482	0.451	0.423	0.397	0.373	0.350	0.329	0.260	4
5	0.906	0.822	0.747	0.681	0.621	0.567	0.519	0.476	0.437	0.402	0.370	0.341	0.315	0.291	0.269	0.250	0.186	5
6	0.888	0.790	0.705	0.630	0.564	0.507	0.456	0.410	0.370	0.335	0.303	0.275	0.250	0.227	0.207	0.189	0.133	6
7	0.871	0.760	0.665	0.583	0.513	0.452	0.400	0.354	0.314	0.279	0.249	0.222	0.198	0.178	0.159	0.143	0.095	7
8	0.853	0.731	0.627	0.540	0.467	0.404	0.351	0.305	0.266	0.233	0.204	0.179	0.157	0.139	0.123	0.108	0.068	8
9	0.837	0.703	0.592	0.500	0.424	0.361	0.308	0.263	0.225	0.194	0.167	0.144	0.125	0.108	0.094	0.082	0.048	9
10	0.820	0.676	0.558	0.463	0.386	0.322	0.270	0.227	0.191	0.162	0.137	0.116	0.099	0.085	0.073	0.062	0.035	10
11	0.804	0.650	0.527	0.429	0.350	0.287	0.237	0.195	0.162	0.135	0.112	0.094	0.079	0.066	0.056	0.047	0.025	11
12	0.788	0.625	0.497	0.397	0.319	0.257	0.208	0.168	0.137	0.112	0.092	0.076	0.062	0.052	0.043	0.036	0.018	12
13	0.773	0.601	0.469	0.368	0.290	0.229	0.182	0.145	0.116	0.093	0.075	0.061	0.050	0.040	0.033	0.027	0.013	13
14	0.758	0.577	0.442	0.340	0.263	0.205	0.160	0.125	0.099	0.078	0.062	0.049	0.039	0.032	0.025	0.021	0.009	14
15	0.743	0.555	0.417	0.315	0.239	0.183	0.140	0.108	0.084	0.065	0.051	0.040	0.031	0.025	0.020	0.016	0.006	15
18	0.728	0.534	0.394	0.292	0.218	0.163	0.123	0.093	0.071	0.054	0.042	0.032	0.025	0.019	0.015	0.012	0.005	16
17	0.714	0.513	0.371	0.270	0.198	0.146	0.108	0.080	0.060	0.045	0.034	0.026	0.020	0.015	0.012	0.009	0.003	17
18	0.700	0.494	0.350	0.250	0.180	0.130	0.095	0.069	0.051	0.038	0.028	0.021	0.016	0.012	0.009	0.007	0.002	18
19	0.686	0.475	0.331	0.232	0.164	0.116	0.083	0.060	0.043	0.031	0.023	0.017	0.012	0.009	0.007	0.005	0.002	19
20	0.673	0.456	0.312	0.215	0.149	0.104	0.073	0.051	0.037	0.026	0.019	0.014	0.010	0.007	0.005	0.004	0.001	20
21	0.660	0.439	0.294	0.199	0.135	0.093	0.064	0.044	0.031	0.022	0.015	0.011	0.008	0.006	0.004	0.003	0.001	21
22	0.647	0.422	0.278	0.184	0.123	0.083	0.056	0.038	0.026	0.018	0.013	0.009	0.006	0.004	0.003	0.002	0.001	22
23	0.634	0.406	0.262	0.170	0.112	0.074	0.049	0.033	0.022	0.015	0.010	0.007	0.005	0.003	0.002	0.002	0.000	23
24	0.622	0.390	0.247	0.158	0.102	0.066	0.043	0.028	0.019	0.013	0.008	0.006	0.004	0.003	0.002	0.001	0.000	24
25	0.610	0.375	0.233	0.146	0.092	0.059	0.038	0.024	0.016	0.010	0.007	0.005	0.003	0.002	0.001	0.001	0.000	25
26	0.598	0.361	0.220	0.135	0.084	0.053	0.033	0.021	0.014	0.009	0.006	0.004	0.002	0.002	0.001	0.001	0.000	26
27	0.586	0.347	0.207	0.125	0.076	0.047	0.029	0.018	0.011	0.007	0.005	0.003	0.002	0.001	0.001	0.001	0.000	27
28	0.574	0.333	0.196	0.116	0.069	0.042	0.026	0.016	0.010	0.006	0.004	0.002	0.002	0.001	0.001	0.000	0.000	28
29	0.563	0.321	0.185	0.107	0.063	0.037	0.022	0.014	0.008	0.005	0.003	0.002	0.001	0.001	0.000	0.000	0.000	29
30	0.552	0.308	0.174	0.099	0.057	0.033	0.020	0.012	0.007	0.004	0.003	0.002	0.001	0.001	0.000	0.000	0.000	30
35	0.500	0.253	0.130	0.068	0.036	0.019	0.010	0.006	0.003	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	35
40	0.453	0.208	0.097	0.046	0.022	0.011	0.005	0.003	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	40