Capital Budgeting Decisions
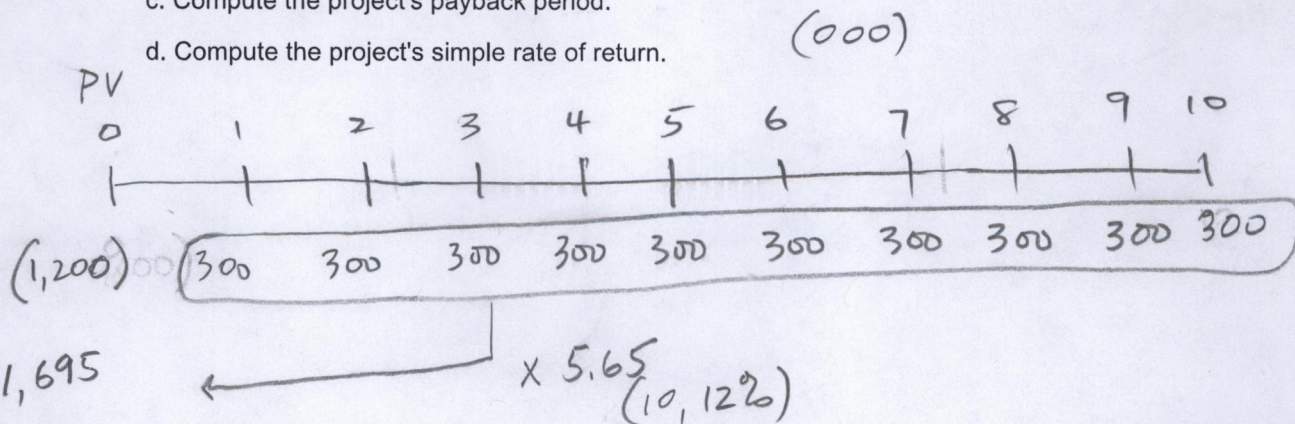
119. (Ignore income taxes in this problem.) Tranter, Inc., is considering a project that would have a ten-year life and would require a $1,200,000 investment in equipment. At the end of ten years, the project would terminate and the equipment would have no salvage value. The project would provide net operating income each year as follows:

Sales		$1,700,000
Variable expenses		1,200,000
Contribution margin		500,000
Fixed expenses:		
Fixed out-of-pocket cash expenses	$200,000	
Depreciation .... non-cash	120,000	320,000
Net operating income		$ 180,000 .

$+ \quad 120,000$

cash $300,000$

All of the above items, except for depreciation, represent cash flows. The company's required rate of return is 12%.

Required:

a. Compute the project's net present value.

b. Compute the project's internal rate of return to the nearest whole percent.

c. Compute the project's payback period.

d. Compute the project's simple rate of return.

(000)

PV

0   1   2   3   4   5   6   7   8   9   10

(1,200)   300   300   300   300   300   300   300   300   300   300

1,695   ← × 5.65 (10, 12%)

(a) 495 = NPV

(b) IRR = $\dfrac{\text{Initial Investment}}{\text{Annual Net Cash Inflow}}$ Factor = $\dfrac{1200}{300}$ = 4.0 ⟹ 21% IRR

(c) Payback Period = 1200 ÷ 300 = 4 yrs. payback

(d) SSR = 180 ÷ 1,200 = 15% SSR

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a. Because depreciation is the only noncash item on the income statement, the annual net cash flow can be computed by adding back depreciation to net operating income.

Net operating income...........	$180,000
Depreciation..........................	120,000
Annual net cash flow	$300,000

	Year(s)	Amount of Cash Flow	12% Factor	Present Value of Cash Flows
Initial investment....................	Now	$(1,200,000)	1.000	$(1,200,000)
Annual net cash flows............	1-10	$300,000	5.650	1,695,000
Net present value.....................				$ 495,000

b. The formula for computing the factor of the internal rate of return (IRR) is:

Factor of the IRR = Investment required ÷ Annual net cash inflow

$1,200,000 ÷ $300,000 = 4.00 Factor

To the nearest whole percent, the internal rate of return is 21%

c. The formula for the payback period is:

Payback period = Investment required ÷ Annual net cash inflow

$1,200,000 ÷ $300,000 per year = 4.0 years

d. The formula for the simple rate of return is:

Simple rate of return = Annual incremental net operating income ÷ Initial investment

$180,000 ÷ $1,200,000 = 15%

Learning Objective: 08-01 Evaluate the acceptability of an investment project using the net present value method.

Learning Objective: 08-02 Evaluate the acceptability of an investment project using the internal rate of return method.

Learning Objective: 08-05 Determine the payback period for an investment.

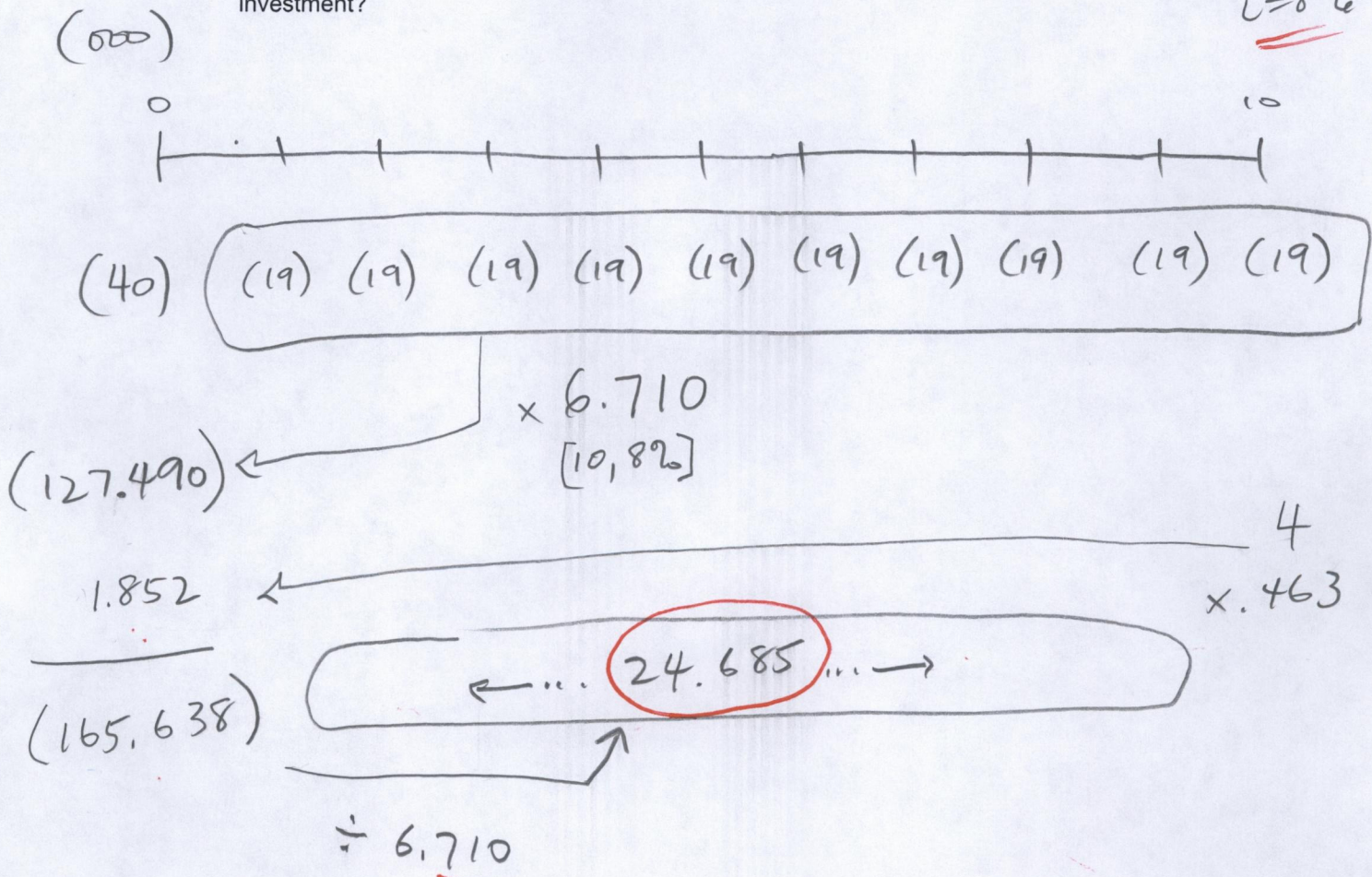*Learning Objective: 08-06 Compute the simple rate of return for an investment.*

Level: 2 Medium

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?

$i = 8\%$

(000)

$$\begin{array}{c}0 \hspace{8cm} 10\end{array}$$

(40)   (19) (19) (19) (19) (19) (19) (19) (19)   (19) (19)

× 6.710
[10, 8%]

(127.490)

1.852

(165.638)

24.685

4
× .463

÷ 6.710

3

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.

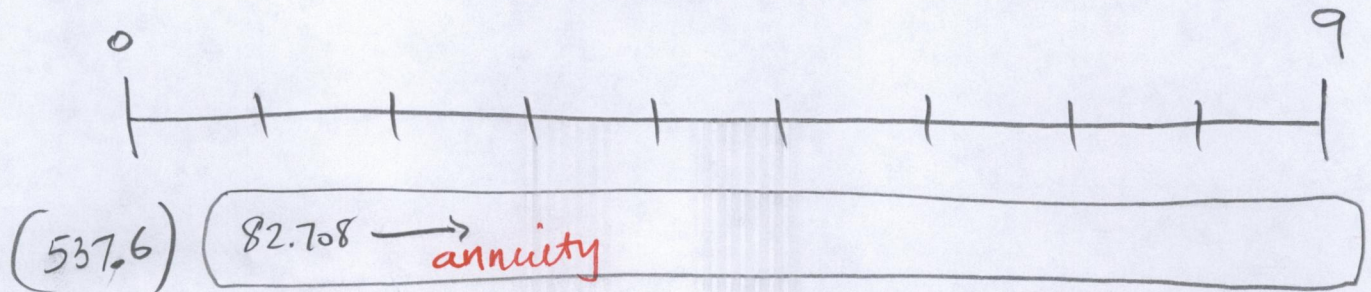*Learning Objective: 08-03 Evaluate an investment project that has uncertain cash flows.*

Level: 3 Hard

140. (Ignore income taxes in this problem.) Brewer Company is considering purchasing a machine that would cost $537,600 and have a useful life of 9 years. The machine would reduce cash operating costs by $82,708 per year. The machine would have a salvage value of $107,520 at the end of the project.

Required:

a. Compute the payback period for the machine.

b. Compute the simple rate of return for the machine.

(000)

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      0                                                    9
      |    |    |    |    |    |    |    |    |    |
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(537.6) $\boxed{82.708 \longrightarrow \text{annuity}}$

107.52

(a) Payback $= \dfrac{537,600}{82,708} = \boxed{6.5 \text{ yrs}}$ ✓

(b) Simple Rate of Return =

$\dfrac{\text{Annual Savings}\quad 82,708}{\text{Annual Deprec}\quad 47,787} = \left(\dfrac{\overset{\text{Inv.}}{537,600} - \overset{\text{SV}}{107,520}}{9} \right)$

Annual NI $34,921 \div \underset{\text{Inv}}{537,600} = \boxed{\begin{array}{c} 6.5\% \\ SRR \end{array}}$

a. The payback period is computed as follows:

Payback period = Investment required ÷ Annual net cash flow

= $537,600 ÷ $82,708 = 6.50 years

In this case the salvage value plays no part in the payback period because all of the investment is recovered before the end of the project.

b. The simple rate of return is computed as follows:

Annual incremental cost savings............................		$82,708
Annual incremental expenses:		
Annual depreciation ($537,600 – $107,520)/9	$47,787	47,787
Annual incremental net operating income............		$34,921

Simple rate of return = Annual incremental net operating income ÷ Initial investment

= $34,921 ÷ $537,600 = 6.50%

Learning Objective: 08-05 Determine the payback period for an investment.

Learning Objective: 08-06 Compute the simple rate of return for an investment.

Level: 2 Medium

YR	BV			Deprec	Tax rate		Cash Benefit
1	800	× 40%	=	320	×	.25	80
2	480	× 40%	=	192	×	.25	48
3	288	× 40%	=	115.2	×	.25	28.8
4	172.8	× 50%	=	86.4	×	.25	21.6
5		× 50%	=	86.4	×	.25	21.6

5. The DDB Corporation wants to purchase a new machine for its factory operations at a cost of $800,000. The investment is expected to generate $400,000 in annual cash flows for a period of five years. The required rate of return is 10%. The old machine can be sold for $75,000. The machine is expected to have zero value at the end of the five-year period. **Income taxes are considered. The new machine is depreciated under the (double-declining balance) method and the tax rate is 25%.**

What is the net present value of the investment?
Would the company want to purchase the new machine?
What is the approximate IRR of the investment?

Tax savings from deprec tax shield.

$$BV \times 2 \left(\frac{100\%}{EUL} \right)$$
or $BV \times 40\%$

$i = 10\%$

(000)

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      0      1       2       3       4       5
      ├──────┼───────┼───────┼───────┼───────┤
(800)
  75       400     400     400     400     400
         × .75    .75     .75     .75     .75
         ───────  ────    ────    ─────   ─────
          300     300     300     300     300        After tax benefit.
         + 80    + 48   +28.8   + 21.6  +21.6        Tax savings from deprec tax shield.
         ────    ────   ─────   ─────   ─────
          380    (348)  328.8   321.6   (321.6)
                                          75
         × 0.909  ×.826   .751    .683   × .621
         ───────  ─────   ─────   ─────  ──────
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$1,299.1632 \leftarrow 345.42 + 287.448 + 246.9288 + 219.6528 + 199.7136$

$574.1632 > 0$
yes

* No annual

$IRR = \overset{?}{\underset{0}{\big|}} \quad > 10\%$

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