



Sample: Economics - Accounting for Fixed Assets

1.
 - VC • Wages paid to temporary workers
 - FC • Property taxes on a factory building.
 - FC • Property taxes on an administrative building.
 - VC • Sales commission.
 - VC • Electricity for machinery and equipment in the plant.
 - FC • Heating and air-conditioning for the plant.
 - FC • Salaries paid to design engineers.
 - FC • Regular maintenance on machinery and equipment.
 - VC • Basic raw materials used in production.
 - FC • Factory fire insurance.

2. The maker of Winglow is purchasing a new stamping machine. Two options are being considered, Rooney and Blair. The sales forecast for Winglow is 8,000 units for next year. If purchased, the Rooney will increase plant fixed costs by \$ 20,000 and reduce variable costs by \$ 5.60 per unit. The Blair would increase fixed costs by \$ 5,000 and reduce variable costs by \$ 4.00 per unit. If variable costs are now \$20 per unit, which machine should be purchased?

Answer:

$TC = VC + FC$

Rooney will reduce total costs by: $(-5.6) \times 8,000 + 20,000 = -24,800\$$;

Blair will reduce total costs by: $(-4) \times 8,000 + 5,000 = -27,000$;

That's why we should purchase Blair, as it is more cost reducing.

3. The cost curve for producing widgets passes through the following points and is piecewise linear in between.

Units Produced	0	200	400	600
Costs	\$600	\$1,200	\$1,600	\$1,800

- a. What is the fixed cost of producing 600 widgets?
- b. What is the variable cost of producing 600 widgets?
- c. What is the cost per unit if only 400 widgets are produced?
- d. What is the incremental cost of producing the 100th widget?
- e. What is the incremental cost of producing the 500th widget?
- f. What is the fixed cost per unit for producing 1,000 widgets?
- g. What is the variable cost per unit for producing 1,000 widgets?

Answer:

$TC = FC + VC$

Units	0	200	400	600
Costs	600	1,200	1,600	1,800
VC	0	600	1,000	1,200
FC	600	600	600	600

- a. $FC = \$600$
- b. $VC = \$1,200$
- c. $ATC = 1,600/400 = \$4$



- d. $MC = (1,200 - 600)/(200 - 0) = \3
 - e. $MC = (1,800 - 1,600)/(600 - 400) = \1
 - f. $FC = \text{const}, AFC = FC/Q = 600/1,000 = \0.6
 - g. If we suppose, that $VC = 1350, AVC = VC/Q = 1,350/1,000 = \1.35
4. Product X is sold for \$ 500 per unit. The total cost of production per year, including capital recovery and a return, is given by the expression

$$TC = 0.04n^3 - 700n + 50,000$$

where n is the number of units sold. If TC represents the total of all fixed and variable costs, determine the following:

- a. The value of n that maximizes profit
- b. The maximum profit for a year
- c. The fixed cost per year

Answer:

- a. We maximize profit, if $MR = MC$, $MR = \Delta TR/\Delta Q = P$, $\Delta TC/\Delta Q$, profit is $TP = TR - TC$. As we calculated (see the excel sheet), $MR = MC$ between 100 and 101 unit, when $n = 100$, $TP = \$30,000$ is max.
 - b. $TP = \$30,000$
 - c. $FC = 50,000$ as the constant number of the TC equation.
5. For each of the following assets, state whether the asset is tangible/ intangible property, personal/ real property, and depreciable/ nondepreciable property.
- a. A melt- indexer used in a company research lab
 - b. A computer used for personal e- mail, blogging, and hobbies
 - c. A plot of land for the production of income
 - d. A file cabinet in your business office
 - e. A restaurant franchise
 - f. A commercial delivery truck
 - g. An amateur radio tower attached to land with multiple antennas on it
 - h. An office complex for business
 - i. Fencing and landscaping around an office complex

Answer:

- a. Tangible, personal, non-depreciable.
- b. Tangible, personal, depreciable.
- c. Tangible, real, non-depreciable.
- d. Tangible, real, non-depreciable.
- e. Tangible, real, non-depreciable.
- f. Tangible, personal, depreciable.
- g. Tangible, personal, depreciable.
- h. Tangible, real, non-depreciable.
- i. Tangible, real, non-depreciable.



6. A surface mount PCB placement/ soldering line is to be installed for \$ 1.6 million. It will have a salvage value of \$ 100,000 after 5 years. Determine the depreciation deduction and the resulting unrecovered investment during each year of the asset's life.

- a. Use straight- line depreciation
- b. Use declining- balance depreciation, with a rate that ensures the book value equals the salvage value
- c. Use double declining balance depreciation
- d. Use double declining balance, switching to straight- line depreciation

Answer:

a.

$$\text{Annual Depreciation Expense} = \frac{\text{Cost of Fixed Asset} - \text{Residual Value}}{\text{Useful Life of Asset}(\text{years})}$$

Book value at beginning of year	Depreciation expense	Accumulated depreciation	Book value at end of year
\$1,600,000 (original cost)	\$300,000	\$300,000	\$1,300,000
\$1,300,000	\$300,000	\$600,000	\$1,000,000
\$1,000,000	\$300,000	\$900,000	\$700,000
\$700,000	\$300,000	\$1,200,000	\$400,000
\$400,000	\$300,000	\$1,500,000	\$100,000 (salvage value)

b. **Annual Depreciation = Depreciation Rate * Book Value at Beginning of Year**

$$\text{depreciation rate} = 1 - \sqrt[N]{\frac{\text{residual value}}{\text{cost of fixed asset}}}$$

Book value at beginning of year	Depreciation rate	Depreciation expense	Accumulated depreciation	Book value at end of year
1,600,000	42,56503%	681,040	681,040	918,960
918,960	42,56503%	391,155	1,072,196	527,804
527,804	42,56503%	224,660	1,296,856	303,144
303,144	42,56503%	129,033	1,425,889	174,111
174,111	42,56503%	74,110.3	1,500,000	100,000



c.

Book value at beginning of year	Depreciation rate	Depreciation expense	Accumulated depreciation	Book value at end of year
\$1,600,000 (original cost)	40%	\$640,000	\$640,000	\$960,000
\$960,000	40%	\$384,000	\$1,024,000	\$576,000
\$576,000	40%	\$230,400	\$1,254,400	\$345,600
\$345,600	40%	\$138,240	\$1,392,640	\$207,360
\$207,360	\$207,360 - \$100	\$107,360	\$1,500,000	\$100,000 (salvage value)

d.

Book value at beginning of year	Depreciation expense (straight-line)	Depreciation rate	Depreciation expense	Depreciation expense (final)	Accumulated depreciation	Book value at end of year
\$1,600,000 (original cost)	\$300,000	40%	\$640,000	\$640,000	\$640,000	\$960,000
\$960,000	\$215,000	40%	\$384,000	\$384,000	\$1,024,000	\$576,000
\$576,000	\$158,667	40%	\$230,400	300	\$1,254,400	\$345,600
\$345,600	\$81,867	40%	\$138,240	300	\$1,392,640	\$207,360
\$207,360	\$107,360	40%	\$82,944	300	\$1,500,000	\$100,000 (salvage value)



7. A robotic precision spot welder is purchased for \$ 380,000. The installation cost is \$ 45,000, which will be expensed. It will have a useful life of 24,000 hours of operation, after which it will have a salvage value of \$ 60,000. It takes 6 minutes to weld a part, and approximately 24,000 units are expected to be welded in the first year, increasing by 24,000 units each year thereafter.

- a. What is the cost basis?
- b. What is the salvage value?
- c. How many years of useful life are expected?
- d. What is the depreciation each year, using the unit of production method of depreciation?

Answer:

- a. Cost basis is \$320,000
- b. Salvage value is \$60,000
- c. Total units quantity = $24,000 \times 60 / 6 = 240,000$, N = 4 years ($24,000 + 24,000 \times 2 + 24,000 \times 3 + 24,000 \times 4 = 240,000$)

d.
$$\text{Annual Depreciation Expense} = \frac{\text{Cost of Fixed Asset} - \text{Residual Value}}{\text{Estimated Total Production}} \times \text{Actual Production}$$

Depreciation = $(380,000 - 60,000) / 240,000 = \1.33 per unit.

Book value at beginning of year	Units	Depreciation cost per unit	Depreciation expense	Accumulated depreciation	Book value at end of year
\$380,000	24,000	\$1.33	\$31,920	\$31,920	\$348,080
\$348,080	48,000	\$1.33	\$63,840	\$95,760	\$284,240
\$284,240	72,000	\$1.33	\$95,760	\$191,520	\$188,480
\$188,480	96,000	\$1.33	\$128,480	\$320,000	\$60,000

8. An X- ray machine at a dental office is MACRS 5- year property. It costs \$ 6,000 and has an expected useful life of 8 years. The salvage value at the end of 8 years is expected to be \$ 500. Assuming MACRS depreciation, what is the book value at the end of the third year?

Answer:

Book value at beginning of year	%	Depreciation expense	Accumulated depreciation	Book value at end of year
6,000	14.29%	\$857.4	\$857.4	\$5,142.6
\$5,142.6	24.49%	\$1,259.42	\$2,116.82	\$2,623.76
\$2,623.76	17.49%	\$458.9	\$2,575.72	\$2,164.86

At the end of the third year we have 17.49% level of depreciation, so the book value will be \$2,164.86.