

HIGH-LOW METHOD

Key Topics to Know

- One of several methods of separating mixed costs into their variable and fixed components.
- Uses only the data points with the highest and lowest activity levels and the costs associated with those two activity levels.
- Relies on the assumption that these two data points are representative of the population of data points. May be an unreliable assumption.
- Result is a regression line passing through these two data points in the form:
$$Y = a + bX$$

Where Y is total cost, a is fixed cost, b is variable cost per unit and X is the number of units
- The regression line will predict total costs (Y) at for any given level of activity (X).

Problems

Problem #1

B Company is a manufacturer of a single product. B Company's income statements for the last two years are given below:

	<u>This Year</u>	<u>Last Year</u>
Units sold	300,000	240,000
Sales revenue	\$1,500,000	\$1,200,000
Less: Cost of goods sold	800,000	740,000
Gross margin	700,000	460,000
Less: Operating expenses	450,000	420,000
Net Income	250,000	40,000

- Required:
- a) Using the high-low method, separate the cost of goods sold and operating expenses into their variable and fixed elements.
 - b) Determine the cost formula for each type of cost.

Problem #2

Electrical costs at one of R Company's factories are listed below:

	Machine-Hours	Electrical Cost
March	413	\$7,371
April	506	\$7,740
May	435	\$7,447
June	486	\$7,660
July	499	\$7,704
August	461	\$7,563
September	467	\$7,571
October	458	\$7,522
November	425	\$7,403

- Required:
- Using the high-low method, the estimate of the fixed and variable components of electrical costs.

Problem #3

M Company produces and sells souvenir products. Monthly income statements for two activity levels are provided below:

	<u>Product 1</u>	<u>Product 2</u>
Number of units	20,000	30,000
Revenue	\$150,000	\$225,000
Cost of goods sold	<u>60,000</u>	<u>90,000</u>
Gross margin	\$90,000	\$135,000
Salaries and commissions	20,000	25,000
Advertising expenses	30,000	30,000
Administrative expenses	<u>12,500</u>	<u>12,500</u>
Total operating expenses	<u>62,500</u>	<u>67,500</u>
Operating Income	\$27,500	\$67,500

- Required:
- a) Identify the mixed expense(s).
 - b) Use the high-low method to separate the mixed costs into variable and fixed components.
 - c) Prepare a contribution margin income statement at the 20,000-unit level.

Multiple Choice Questions

The next 2 questions refer to the following information.

Ajax uses the high-low method of estimating costs. Ajax had total costs of \$50,000 at its lowest level of activity, when 5,000 units were sold. When, at its highest level of activity, sales equaled 12,000 units, total costs were \$78,000.

1. Ajax would estimate variable cost per unit as
 - a) \$10.00
 - b) \$6.50
 - c) \$4.00
 - d) \$7.53

2. Ajax would estimate fixed costs as
 - a) \$28,000
 - b) \$30,000
 - c) \$64,000
 - d) \$128,000

3. F Company, which uses the high-low method, reported total costs of \$24 per unit at its lowest activity level, when production equaled 10,000 units. When production doubled, at its highest activity level, the total cost per unit dropped to \$15. Foster would estimate variable cost per unit as
 - a) \$9
 - b) \$6
 - c) negative \$9
 - d) negative \$0.0009

4. J Company uses the high-low method of estimating costs. Ajax had total costs of \$50,000 at its lowest level of activity, when 5,000 units were sold. When, at its highest level of activity, sales equaled 12,000 units, total costs were \$78,000. What would Ajax estimate its total cost to be if sales equaled 8,000 units?
 - a) \$32,000
 - b) \$52,000
 - c) \$62,000
 - d) \$80,000

The next 3 questions refer to the following information.

Supply costs at C Company's chain of gyms are listed below:

	<u>Client-Visits</u>	<u>Supply Cost</u>
January	12,183	\$26,642
February	12,408	\$26,853
March	12,232	\$26,675
April	12,597	\$27,854
May	12,527	\$26,988
June	12,608	\$27,064
July	12,143	\$26,585
August	12,005	\$26,354
September	11,944	\$26,393

Management believes that supply cost is a mixed cost that depends on client-visits. Use the high-low method to estimate the variable and fixed components of this cost.

5. Compute the variable component, rounding off to the nearest whole cent.
 - a) \$2.18
 - b) \$1.01
 - c) \$1.04
 - d) \$0.99

6. Compute the fixed component, rounding off to the nearest whole cent.
 - a) \$14,607
 - b) \$13,949
 - c) \$14,330
 - d) \$26,745

7. At an activity level of 8,300 machine-hours in a month, B Company's total variable maintenance cost is \$220,448 and its total fixed maintenance cost is \$556,764. What would be the total variable maintenance cost at an activity level of 8,600 machine-hours in a month? Assume that this level of activity is within the relevant range.
 - a) \$777,212
 - b) \$220,448
 - c) \$576,888
 - d) \$228,416

Solutions to Problems

Problem #1

<u>Cost of goods sold:</u>	<u>Cost</u>	<u>Activity</u>
High level of activity	\$800,000	300,000
Low level of activity	<u>740,000</u>	<u>240,000</u>
Change	\$ 60,000	60,000

Variable cost per unit = $\$60,000 / 60,000 \text{ units} = \1.00 per unit

Fixed costs = $\$800,000 - \$1.00 \times 300,000 = \$500,000$

OR

Fixed costs = $\$740,000 - \$1.00 \times 240,000 = \$500,000$

Equation: $Y = 500,000 + 1X$

<u>Operating expenses:</u>	<u>Cost</u>	<u>Activity</u>
High level of activity	\$450,000	300,000
Low level of activity	<u>420,000</u>	<u>240,000</u>
Change	\$ 30,000	60,000

Variable cost per unit = $\$30,000 / 60,000 \text{ units} = \0.50 per unit

Fixed costs = $\$450,000 - \$0.50 \times 300,000 = \$300,000$

OR

Fixed costs = $\$420,000 - \$0.50 \times 240,000 = \$300,000$

Equation: $Y = 300,000 + .5X$

Problem #2

<u>Electrical costs:</u>	<u>High Point</u>	<u>Low Point</u>	<u>Change</u>	<u>Variable Cost per Unit</u>
Cost	\$7,740	<u>\$7,371</u>	\$369	
Activity	506	413	93	\$3.97

Fixed costs = $\$7,740 - \$3.97 \times 506 = \$5,731$

Problem #3

a)
The salaries and commissions cost is mixed.

b)

	<u>High</u>	<u>Low</u>	<u>Change</u>	
<u>Cost</u>	<u>\$25,000</u>	<u>\$20,000</u>	<u>\$5,000</u>	
<u>Units</u>	<u>30,000</u>	<u>20,000</u>	<u>10,000</u>	\$.50 per unit
	<u>Total cost</u>	<u>Variable cost</u>	<u>Fixed cost</u>	
Fixed cost	\$25,000	30,000 x \$.50	\$10,000	

c)

Number of units	20,000
Revenue	\$150,000
Cost of goods sold	60,000
Salaries and commissions	<u>10,000</u>
Contribution margin	80,000
Salaries and commissions	10,000
Advertising expenses	30,000
Administrative expenses	<u>12,500</u>
Total operating expenses	<u>52,500</u>
Operating Income	\$27,500

Solutions to Multiple Choice Questions

- | | |
|----|---|
| 1. | C |
| 2. | B |
| 3. | B |
| 4. | C |
| 5. | B |
| 6. | C |
| 7. | D |