# 1. Answer:

a) Influence Diagram:

Return on Investment (ROI)

Turnover (T)

Earnings (E)

Sales (S)

Sales (S)

Cost of Sales (CS)

Sales (S)

Total Investment (TI)

Current Assets (CA)

Fixed Assets (FA)

Inventories (I)

Cash (C)

Variable Production Costs (VPC)

Accounts Receivables (AR)

Selling Expenses (SE)

Freight and Delivery (FD)

Administrative Costs (AC)

b) Symbols and mathematical model:

ROI = return on investment

T = turnover

E = earnings

S = sales

TI = total Investment

CA = current assets

FA = fixed assets

I = inventories

AR = accounts receivable

C = cash

CS = cost of sales

VPC = variable production costs

SE = selling expenses

FD = freight and delivery

AC = administrative costs

So, ROI = T \*(E/S)

Also, T = S/TI

Therefore, ROI = (S/TI) \* (E/S)

= E/TI ………. (i)

Again, TI = CA + FA

Also, CA = I + AR + C

So, TI = I + AR + C + FA …………. (ii)

Again, E = S - CS

Also, CS = VPC + SE + FD + AC

So, E = S – (VPC + SE + FD + AC) …………. (iii)

Finally, replacing E and TI in (i), ROI = (S – (VPC + SE + FD + AC)) / (I + AR + C + FA)

# 2. Answer:

|  |  |
| --- | --- |
| **Equation:** |  |
| Average balance = -17,732 + (367 \* age) + (1300 \* years education) + (0.116 \* household weath) |  |
|  |  |
| **a) Explanation:** |  |
| Average checking and savings account balance is |  |
| 367 times the age of the customer |  |
| plus |  |
| 1300 times the years spent on education |  |
| plus |  |
| 0.116 times household wealth |  |
| minus 17,732 |  |
|  |  |
| Here, the balance in the account increases by $367 on average with increase in customer's age.  The balance in the account increases by $1,300 on average with increase in years spent on education.  The balance in the account increases by $0.116 for every $1 increase in household wealth. |  |
|  |  |
|  |  |
| **b) Calculation:** |  |
| Here, |  |
| Age | 32 |
| Years of education | 16 |
| Household wealth | 150,000 |
|  |  |
| So, Average balance = -17,732 + (367 \* 32) + (1300 \* 16) + (0.116 \* 150,000) = | 32,212 |

# 3. Answer:

|  |  |  |  |
| --- | --- | --- | --- |
| **Inhouse** | | **Outsourced** | |
| Quantity | 1,500 | Quantity | 1,500 |
| Logistics Fixed cost | 6,000 | Unit cost | 17 |
| Unit cost | 15 |  |  |
| **Total cost of servicing** | 28500 | **Total cost of servicing** | 25500 |
| Formula | Logistics Fixed + (Unit cost \* Quantity) | Formula | Unit cost \* Quantity |
|  |  |  |  |
| **a) better decision:** | Outsource |  |  |
| **b) Breakeven volume:** |  |  |  |
| Difference in variable cost (unit cost) = | 2 |  |  |
| Fixed cost = | 6,000 |  |  |
| **Breakeven quantity =** | 3,000 | (Fixed cost/ difference in variable cost) | |

# 4. Answer:

|  |  |
| --- | --- |
| Price = P |  |
| Demand model | = 2500 - 3P |
| Cost model | = 5000 + 5D |
|  | = 5000 + 5 \* (2500 - 3P) |
|  | = 5000 + 12500 - 15P |
|  | = 17500 - 15P |
| Total revenue | = D \* P |
| Total Profit | = Total revenue - total cost |
|  | = D \* P - (17500 - 15P) |
|  | = (2500 - 3P) \*P - (17500 - 15P) |
|  | = 2500P- 3P^2 - 17500 + 15P |
|  | = -17500 + 2515P - 3P^2 |
|  |  |
| Total Profit Model | = -17500 + 2515P - 3P^2 |

According to the excel spreadsheet for this question, maximum profit can be achieved for approximate price $335.

# 5. Answer:

Table

Description automatically generated

The VLOOKUP formula with the MATCH formula helps my get the unit price by looking up the selected product (Dropdown) first, then getting the column number for the selected size (Dropdown) to do an exact match.

Finally, the workbook takes in the quantity, which is entered manually, and total invoice is created using the following formula:

Total Invoice = Unit price \* Quantity

# 6. Answer:

First, I created a column using the following formula:

Sales Revenue = Unit Price \* Units Sold

Below is screenshot with he new column as well as the formula:

Graphical user interface, application, table, Excel

Description automatically generated

Then I used, SUMIF to sums for all the stores and regions. The formulas look like these:

Total Sales Revenue by Store No. =SUMIF($B$12:$B$107,K2,$I$12:$I$107)

Total Sales Revenue by Region = =SUMIF($C$12:$C$107,N2,$I$12:$I$107)

Below is a screenshot of those views as well as a pivot table just for validation purpose.

Table

Description automatically generated

# 7. Answer:

First, I calculated number of days for the whole stay using the following formula:

=G4-F4

(Departure Date – Arrival Date)

Table

Description automatically generated

The I calculated the meal charges for the whole stay using the following formula:

=IF(H4>2,(H4-2)\*20\*J4,0)

Here, H4 is number of days for the whole stay.

Table

Description automatically generated

The I calculated the total revenue before discount using the following formula:

=I4\*J4+K4

Here, I4 = daily rate; J4 = days stayed; K4 = total meals cost

A picture containing table

Description automatically generated

Finally, I calculated the total revenue after applying the condition for discount using the following formula:

=IF(J4>=7,L4\*0.9,L4)

Here, J4 = days stayed, L4 = Total revenue before discount

Graphical user interface, application, table, Excel

Description automatically generated

# 8. Answers:

a) i) First, I used the following formula to get the counts for loan categories:

=COUNTIF($A$4:$A$428,R4)

Here, Column A has transactions of loan purposes name and column R has the few selected loan for the conditional count purpose.

A picture containing calendar

Description automatically generated

ii) Then I used the following formula to get the counts of customers of with less than $500 on their checking account:

=COUNTIF(B4:B428,"<500")

Here, column B has the checking account balances.

A picture containing table

Description automatically generated

b) I used the following formula to categorize checking account balances:

=IF(B4<250,"Low",IF(B4>=2000,"High","Medium"))

Here, column B has checking account balances.

Similarly, I have used the following formula to categorize savings account balances:

=IF(C4<250,"Low",IF(C4>=2000,"High","Medium"))

Here, column C has saving account balances.

Below is a screenshot:

Graphical user interface, application, table, Excel

Description automatically generated