Make or Buy Decision

Question # 1:

Part (a)

The Break even analysis for the make & buy options is given in the following figure:

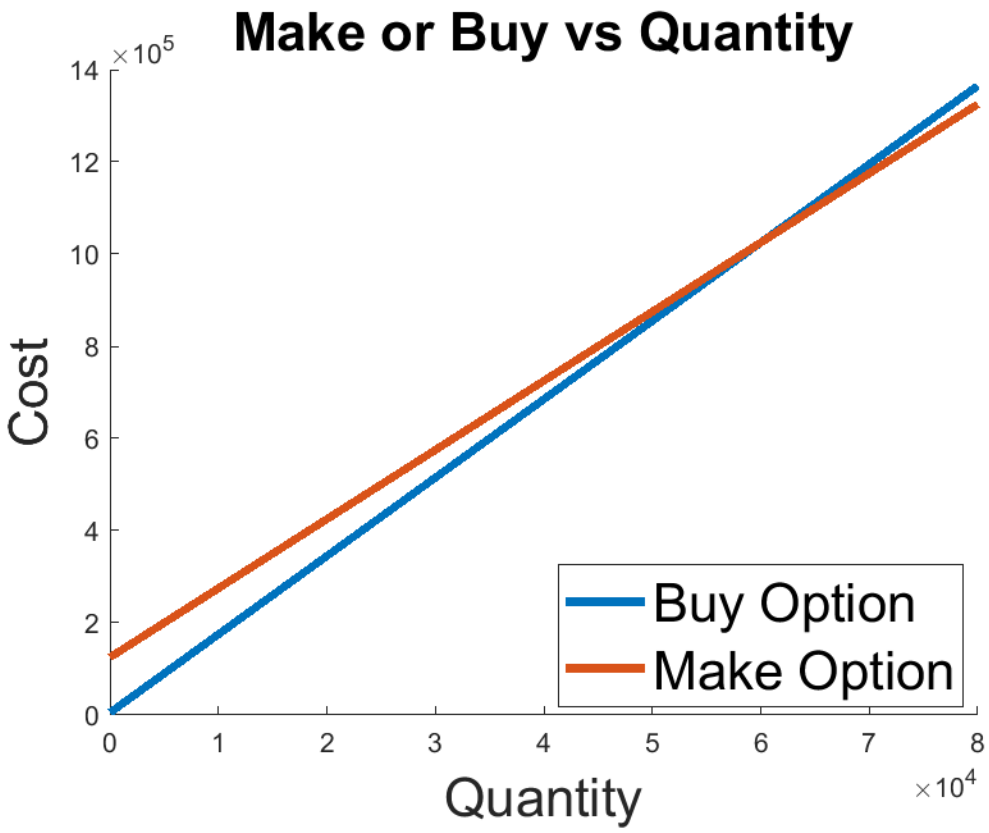

Figure 1

$$B_{cost}(Q) = B_{fc} + B_{vc} * Q$$

$$M_{cost}(Q) = M_{fc} + M_{vc} * Q$$

From the above graph, we may observe that the break even point lies approximately around 6000. Calculating Accurately by equating the buy and make equations, we get the exact point:

$$B/E\ Point = 60000$$

Total cost at this point is:

$$Cost@BE = 1025000$$

Part (b)

Given a requirement of 150,000, the make option is cheaper as compared to the make option (refer to figure 1).

The cost savings would be defined as:

$$savings = B_{cost}(150{,}000) - M_{cost}(150{,}000)$$

$$savings = 180{,}000$$

Question # 2

Make option:

$$fixed\ cost = \$50,000$$
$$variable\ cost = \$25$$

Buy option:

$$fixed\ cost = \$1000$$
$$variable\ cost = ?$$

Solution:

The criterion is defined as follows:

$$(fixed\ cost)_{buy} + 20000 * (variable\ cost)_{buy} < (fixed\ cost)_{make} + 20000 * (variable\ cost)_{make}$$

Then,

$$(variable\ cost)_{buy} < ((fixed\ cost)_{make} + Q * (variable\ cost)_{make} - (fixed\ cost)_{buy})/Q$$

Substituting values,

$$(variable\ cost)_{buy} < \$27.4500$$

Hence the maximum cost is $27.45.

Other criterions to look for: As discussed in the lectures, the firm should look at the seller's standing in the market and work on developing good long terms relationships with them. In the above analysis, this factor is not accounted for.

Question # 3

$$Q = 20{,}000 \text{ units}$$

Make option:

$$fixed\ cost = \$50{,}000$$
$$variable\ cost = \$8$$

Buy option:

$$fixed\ cost = \$600$$
$$variable\ cost = \$10$$

Part (a)

The breakeven plot for both buy & make is given below:

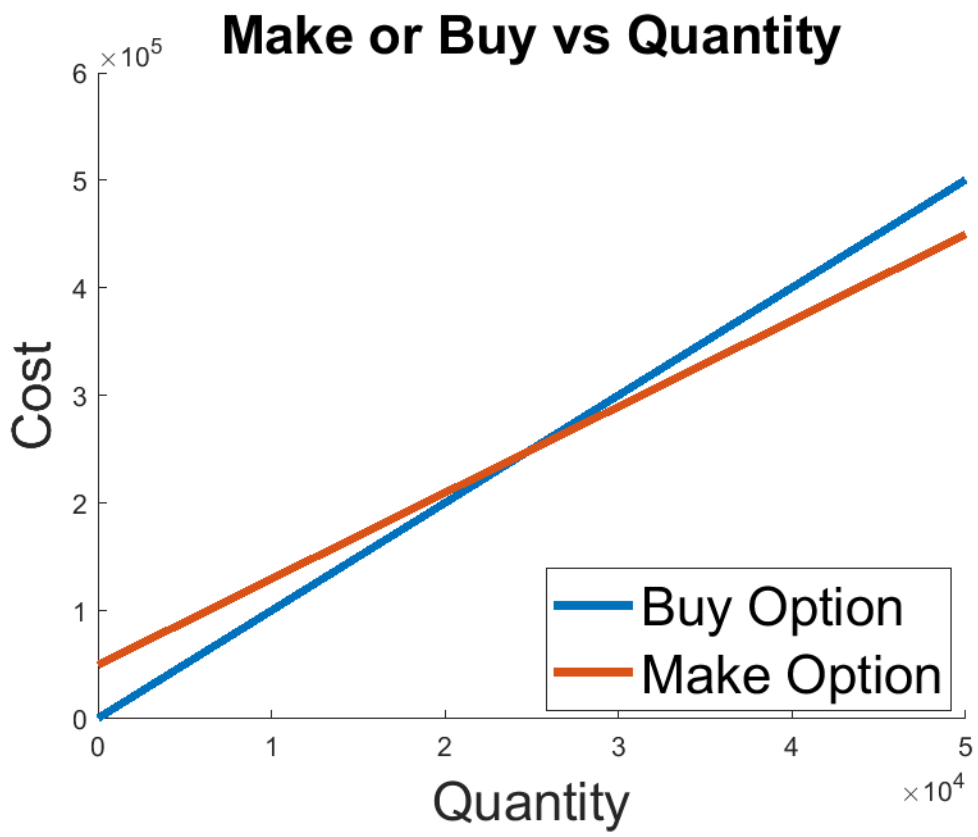

Figure 3

As is being observed, the breakeven point lies at 24,700 units. Since the requirement is only of 20,000 units, the buy option would be cheaper (refer to figure 3).

The total cost at the breakeven point is given as follows:

$$Total\ Cost\ @\ BE = \ M_{cost} = B_{cost}(@24{,}700) = \ B_{fc} \ + \ B_{vc} * 24700$$

$$Total\ Cost\ @\ BE = \$247{,}600$$

Part (b)

Total cost for both options is given below:

$$Cost_{buy\ option} = \$200600$$
$$Cost_{make\ option} = \$210000$$

As evident, the buy option is cheaper (as was suggested in the previous part). The total savings would be:

$$savings = make\ cost - buy\ cost$$
$$savings = \$9400$$

Total Cost of Ownership

Question # 1

The total cost analysis can be found in the attached excel file *[**sheet-name**: Q1].* The overall costs are:

Total Cost of Ownership	Supplier 1	6,578,017		Supplier 2	6,980,783

It can be seen that cost of supplier 1 is less than that of supplier 2. Hence we should go with supplier 1.

Question # 2

The total cost analysis can be found in the attached excel file *[**sheet-name**: Q2].* The overall costs are:

Total Cost of Ownership	**Supplier 1**	**50,414,600**	**Supplier 2**	**49,772,400**	**Supplier 3**	**53,688,600**

It can be observed that the cheapest option to go with is supplier 2.

Notes

The following MATLAB script was used in obtaining the graphs/solution:

Question # 1 (a and b)

```
Q = 1: 160000;
Bfc = 5000; Bvc = 17; %buying fixed cost (Bfc) and variable cost (Bvc)
Mfc = 125000; Mvc = 15; %Making fixed cost (Mfc) and variable cost (Mvc)

B = Bfc + Bvc*Q;
M = Mfc + Mvc*Q;
hold on
fs = 20
plot(Q, B, 'linewidth', 3)
plot(Q, M, 'linewidth', 3)
title('Make or Buy vs Quantity', 'fontsize', fs)
xlabel('Quantity', 'fontsize', fs)
ylabel('Cost', 'fontsize', fs)
legend('Buy Option', 'Make Option','fontsize', fs, 'location', 'best')
hold off
print -dpng q1.png
BE = (B==M);
BE = find(BE)
B(BE)
savings = B(150000) - M(150000)
```

Question # 2:

```
fc_make = 50000; vc_make = 25;
Q = 20000;
fc_buy = 1000;
variable_buy = (fc_make + Q*vc_make - fc_buy)/Q
```

Question # 3:

```
Q = 1:50000;
Bfc = 600; Bvc = 10;
Mfc = 50000; Mvc = 8;
B = Bfc + Bvc*Q;
M = Mfc + Mvc*Q;

hold on
fs = 20
plot(Q, B, 'linewidth', 3)
plot(Q, M, 'linewidth', 3)
title('Make or Buy vs Quantity', 'fontsize', fs)
xlabel('Quantity', 'fontsize', fs)
ylabel('Cost', 'fontsize', fs)
legend('Buy Option', 'Make Option','fontsize', fs, 'location', 'best')
hold off
print -dpng q3.png
BE = (B==M);
BE = find(BE) %find break even point's index
price_at_BE = B(BE) %check cost @ BE point

%part b
price_buy_option = B(20000)
price_make_option = M(20000)
savings = price_make_option - price_buy_option
```