Optimal Production

LLE Mathematics and Statistics

1. A company produces an item that can be manufactured on one of two machines (named A and B). Their primary concern is going to be costs. If q_A are produced on machine A, the cost of production is

$$TC_A = 10 + 20q_A$$

If q_B are produced on machine B, the cost of production is

$$TC_B = 2 + q_B^2$$

The company are about to produce 100 of the item.

   (a) What is the total cost if all are produced on machine A?

   (b) What is the total cost if all are produced on machine B?

   (c) What combination of machine A and machine B would minimize the total cost, and what would that total cost be?

2. A manufacturing firm has access to two aging factories, G and H, for manufacturing. The firm does g items from G and h items from H. The costs of the factory production are:

$$TC_G = 80 + 10g^{1.5}$$

$$TC_H = 100 + 12h^{1.25}$$

If the firm produces 420 items, what is the cost of manufacturing if:

   (a) All are at G?

   (b) All are at H?

   (c) If they minimise the total cost and use both G and H?