## 10.2

10.2 In a particular workshop, Average cost per unit $= \frac{11,700 + 3.8X}{X}$

At what production level (X) is the Average cost = £7.40 per unit?





## 10.2

- We are given the average cost per unit $\frac{11.700 + 3,8x}{x}$
- This means that the workshop has fixed costs of £ 11,700 and variable cost per unit of £ 3,80
- If the average cost per unit is to be £ 7,40 then we must have

$$7,40 = \frac{11.700 + 3,8x}{x}$$

- So in order to answer the question we have to solve the equation above





## 10.2

$7,40 = \frac{11.700 + 3,8x}{x}$ | ·(x) cross multiplication

7,40x = 11.700+3,8x | (-3,8x)
7,40x – 3,8x = 11.700+3,8x – 3,8x
3,6x = 11.700 | (:3,6)
x =11.700/3,6 =3250

Answer X=3250





## 10.3

Solve the following equations in X.

(i) $4(5 - X) = 2X - 1$

(ii) $\frac{18 + 6X}{67 - 5X} = 7$





## 10.3 (i)

4·(5 - x) = 2x - 1 | expand
4·5 - 4x = 2x – 1
20 - 4x = 2x - 1 | (-20)
20 – 20 - 4x = 2x – 1 – 20
- 4x = 2x – 21 | (-2x)
- 4x - 2x = 2x – 21 - 2x
-6x = -21 | ·(-1)
6x = 21 | :(6)
x = 21/6=3,5

Answer X=3,5





## 10.3 (ii)

$\frac{18 + 6x}{67 - 5x} = 7$ | ·(67-5x) cross multiplication

(18 + 6x) = 7·(67 - 5x) | expand
18 + 6x = 469 – 35x | (-18)
18 + 6x - 18 = 469 – 35x – 18 | (+35x)
6x + 35x = 451 – 35x + 35x | (-20)
41x = 451 | (:41)
x = 451/41 = 11

Answer X=11

## 10.5

10.5 A small workshop produces two versions of an electronic device. These are the Albany and the Buckingham.
Essentially, there are two production processes: Assembly and Finishing. Assembly has a capacity of 200 *hours* and both versions take 30 *minutes* per unit to assemble.
Finishing has a capacity of 150 hours and the Albany takes 15 minutes per unit to finish whereas the Buckingham takes 30 minutes per unit.

Find the production of Albanys and Buckinghams at which Assembly and Finishing are fully utilised.





## 10.5

- Let A = no. Of Albanys to produce & B = no. of Buckinghams to produce
- We now write down an expression to represent how much time in the Assembly process this production schedule will require and then we equate the expression to the maximum time available i.e. 200 hrs (=200·60 = 12.000mins). This results in the first equation below. We do the same thing for the Finishing process to obtain the second equation below.
  - Assembly: **30A + 30B = 12.000**mins (1)
  - Finishing: **15A + 30B = 9.000** mins (2)





## 10.5

- Subtracting equation (2) from equation (1) we get

$$\begin{array}{r} 30A + 30B = 12.000 \\ -\ 15A + 30B = 9.000 \end{array}$$

15A = 3.000 | (:15)
A = 3.000/15 = 200

- Now substitute this value of A into equation (1)

30·(200) + 30B = 12.000 | expand
6.000 + 30B = 12.000 | (-7.000)
30B = 6.000 | (:30)
B = 6.000/30 = 200

**Fully utilizing the resources available we get A = 200, B=200**





## 10.5

10.7 Use the power ($X^Y$) function on your calculator to evaluate the following to three decimal places.

(i) $1.08^{15}$ (ii) $0.91^6$

15 times

- $1{,}08^{15}$ = **1,08·1,08·1,08·1,08·1,08·1,08·1,08·1,08· 1,08·1,08·1,08·1,08·1,08·1,08·1,08 = 3,1721691 ≈ 3,172**
- $0{,}91^6$ **= 0,91·0,91·0,91·0,91·0,91·0,91 = 0,5678692 ≈ 0,568**