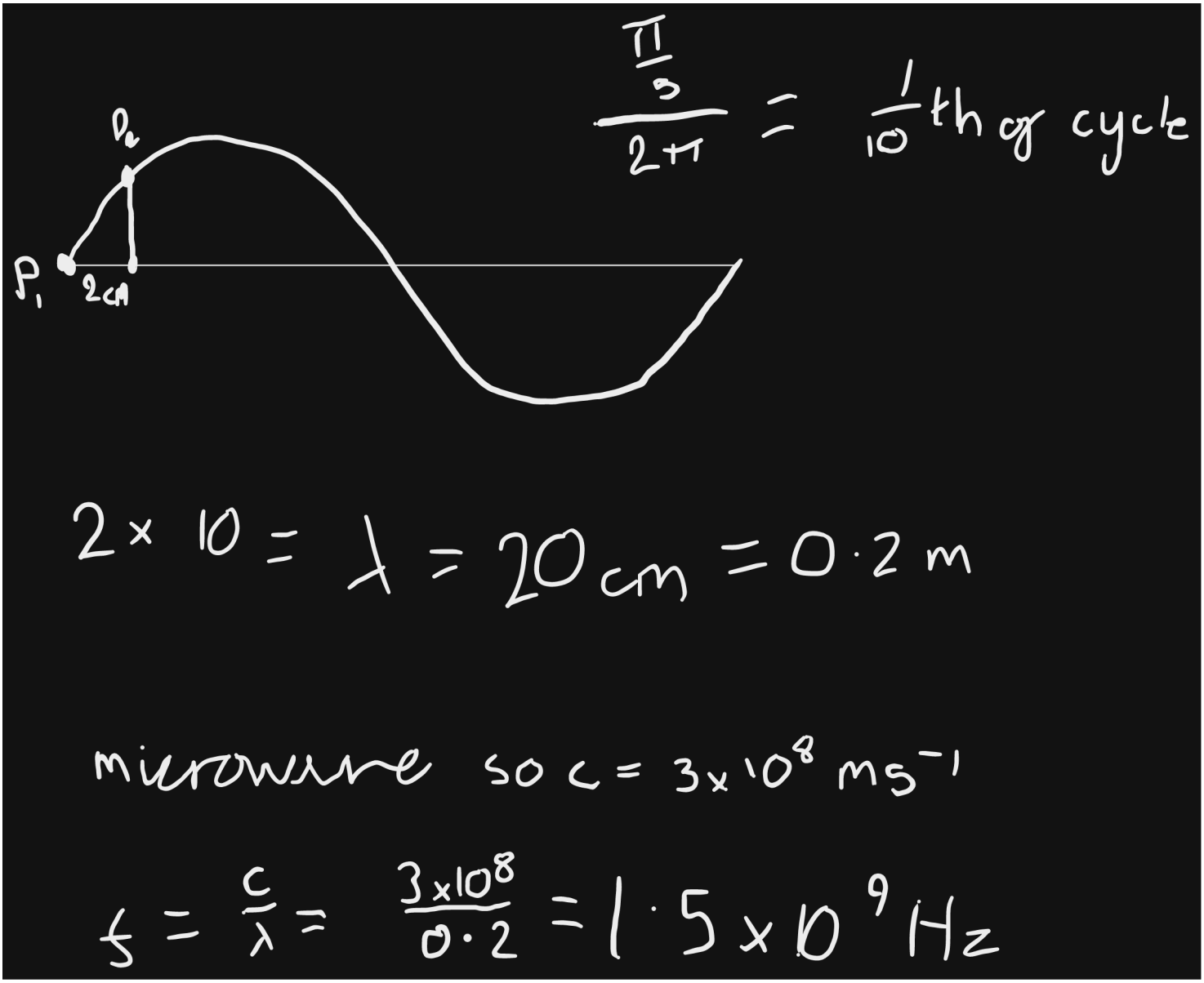
1.4 Q4


$\frac{\pi}{3}$
$2\pi$
$= \frac{1}{10}$th of cycle
$P_2$
$P_1$
2cm
$2 \times 10 = \lambda = 20\,cm = 0.2\,m$
microwave so $c = 3 \times 10^8\,ms^{-1}$
$f = \frac{c}{\lambda} = \frac{3 \times 10^8}{0.2} = 1.5 \times 10^9\,Hz$

4.1 Q4

$$d \sin\theta = n\lambda$$

$$\theta = \sin^{-1}\left(\frac{n\lambda}{d}\right)$$

600 l/mm

600000 l/m

$$\frac{1}{600000} = 1\text{m/line}$$

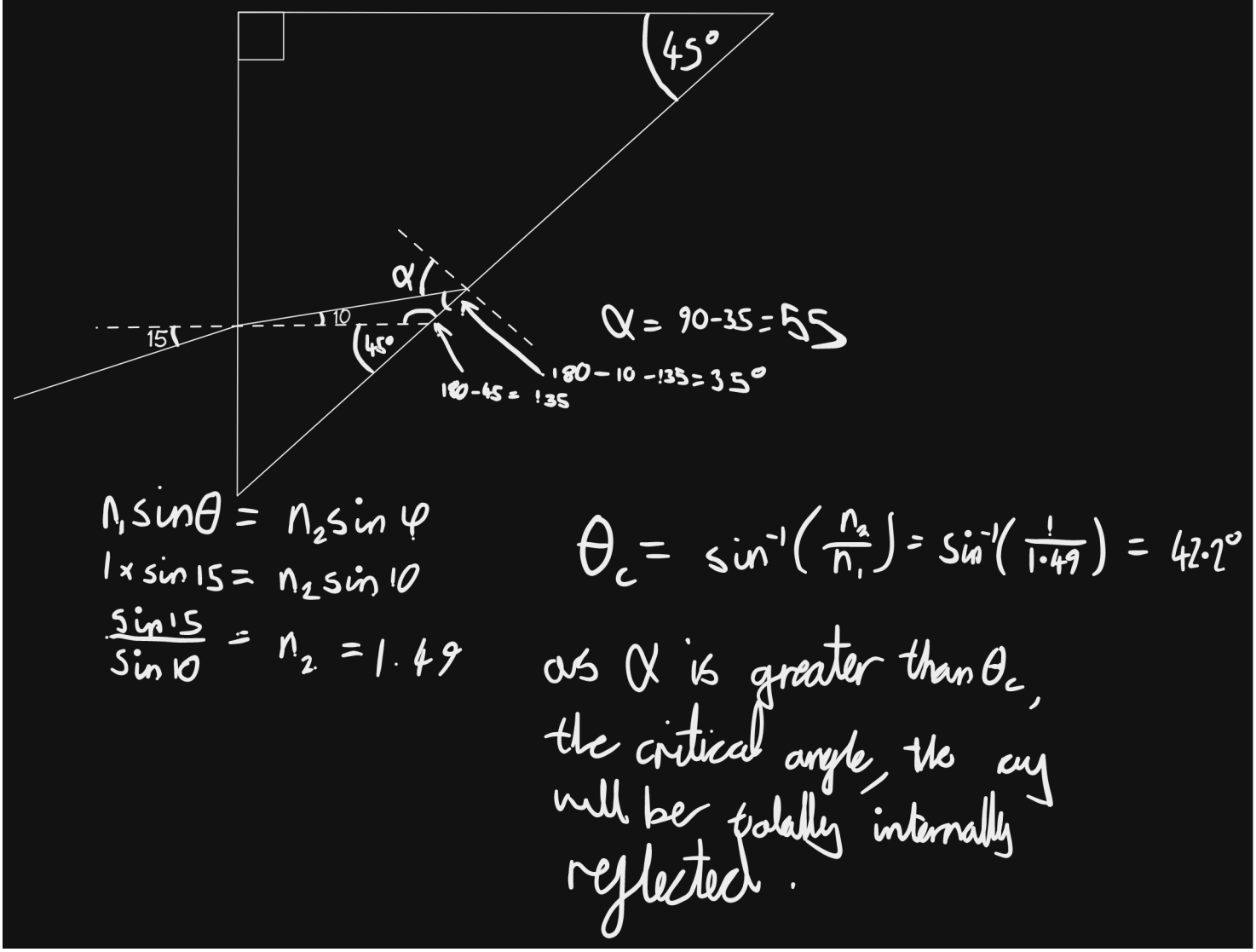
$$c = f\lambda \quad \lambda = \frac{c}{f} = \frac{3\times10^{8}}{508\times10^{14}} = 5.91\times10^{-7}\text{m}$$

$$\theta = \sin^{-1}\left(\frac{2\times5.91\times10^{-7}}{1/600000}\right)$$

$$\theta = 45.17$$

$$\theta = 45.2^{\circ}$$

5.2 Q3




6.2 Q4

As there is a range of kinetic energies, there must be something else taking the rest of the energy away, as due to the conservation of energy all of the input energy must be conserved, and so there must be some particle taking away that excess energy, which was called a neutrino.

6.4 Q1

Ionisation is where an atom loses one or more electrons.

6.5 Q3

Between 0fm and 0.5fm, the strong nuclear force repels nucleons, where the closer they are the stronger the repelling force. From 0.5fm the strong interaction attracts nucleons. It has a range of around 2-3fm.

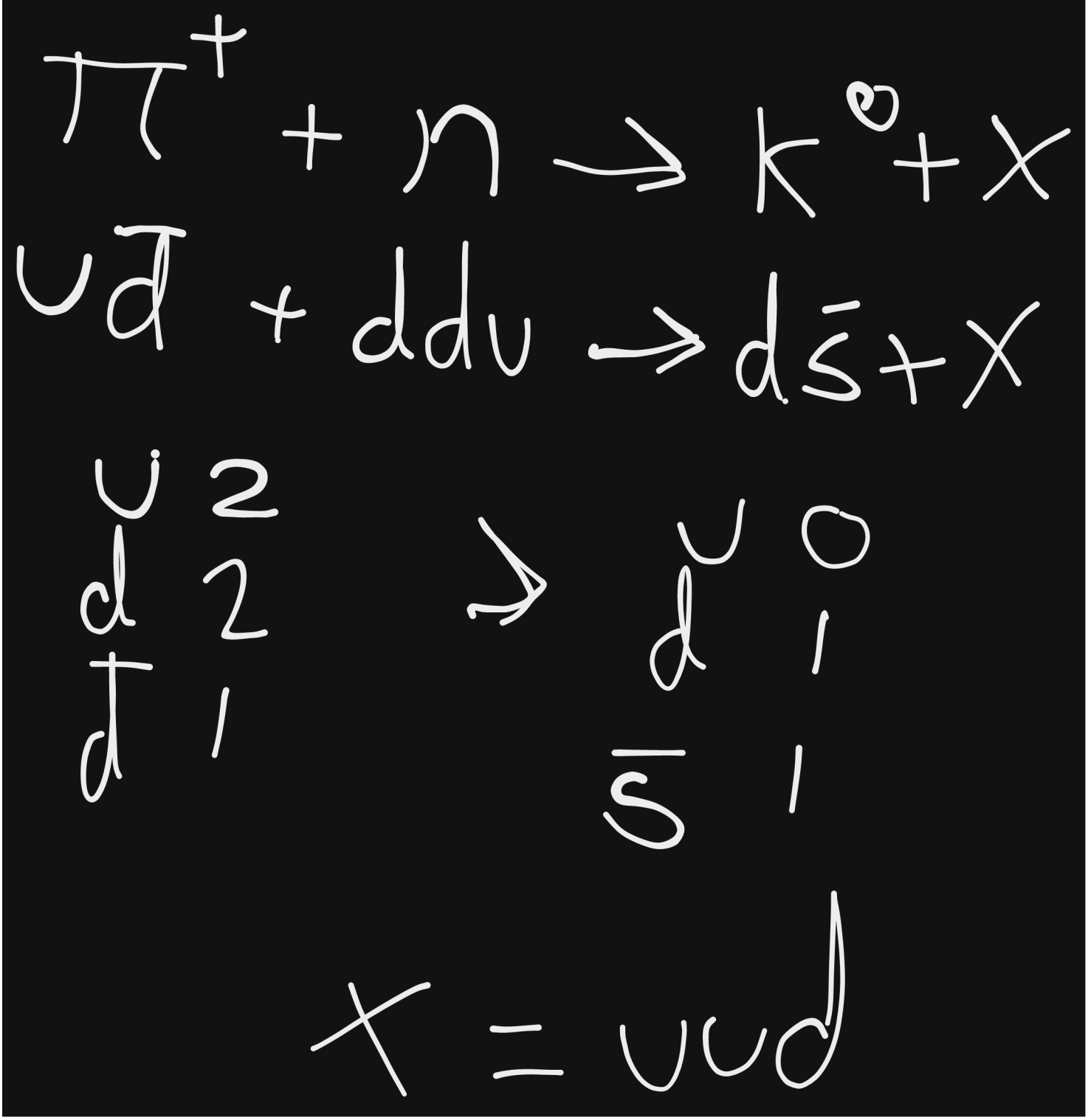
10.2 Q4

$E : p + e \rightarrow n + \nu_e$

$L_e : 0 + 1 \rightarrow 0 + 1$ <= Electron lepton number

$B : 1 + 0 \rightarrow 1 + 0$ <= Baryon Number

10.4 Q4




11.1 Q3

In $hf = \phi + E_k$, $\phi$ is constant so increasing the frequency will increase the stopping potential.

11.4 Q2

The work function is the minimum energy required to get an electron out of the metal surface.

11.5 Q1

$$E_{kmax} = eV_s$$

$$V_s = \frac{E_{kmax}}{e} = \frac{1.43 \times 10^{-19}}{1.6 \times 10^{-19}} = 0.89\,V$$

15.2 Q4

moments around B:

anticlockwise

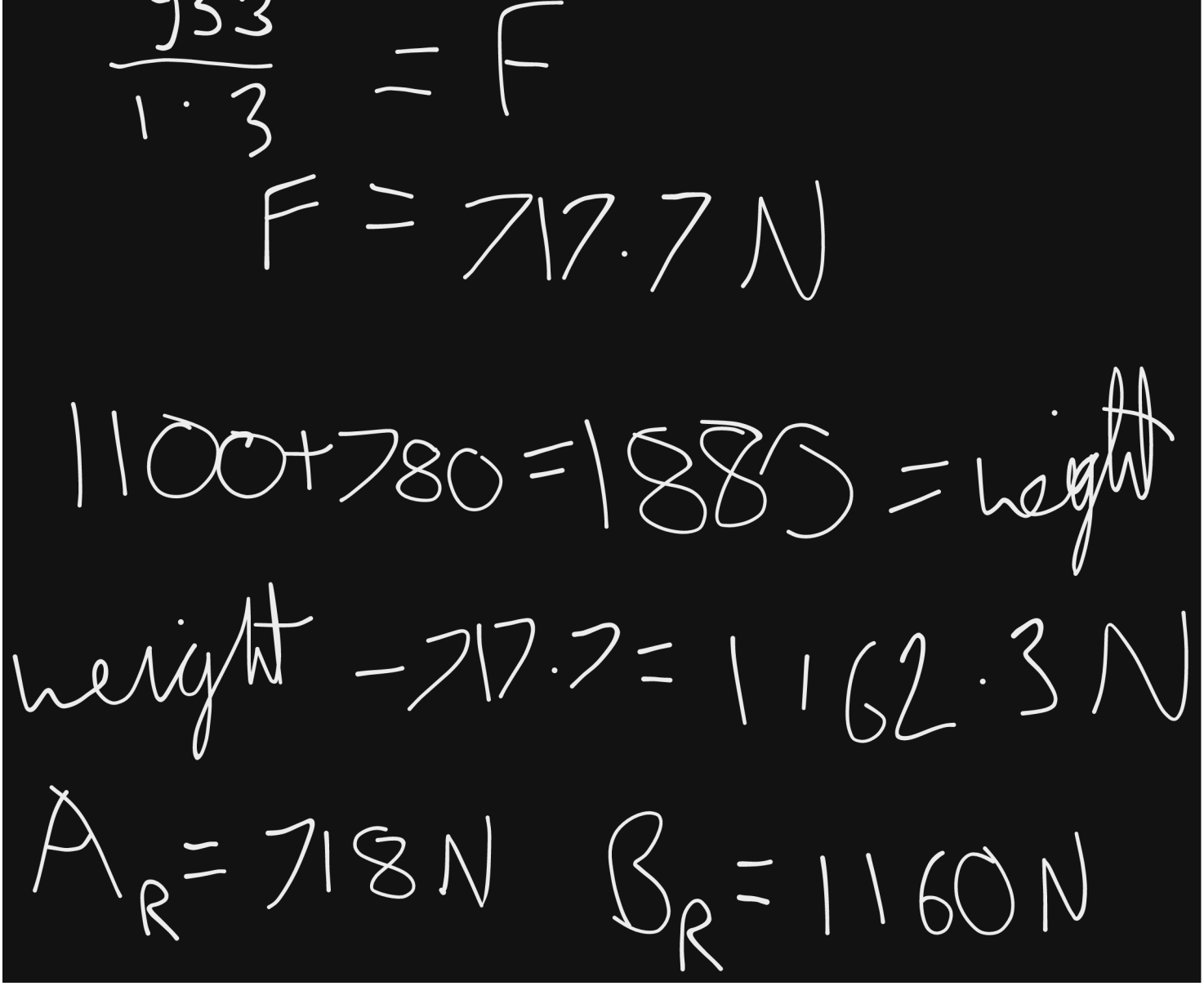
$1100 \times 0.6 = 660$

$780 \times 0.35 = +273$

$933\ Nm$

$\Sigma a_{cm} = \Sigma_{cm}$

$933 = F \times 1.3$




15.4 Q2

The moment of a couple is the rotational affect of two opposite and equal forces acting some perpendicular distance from each other.