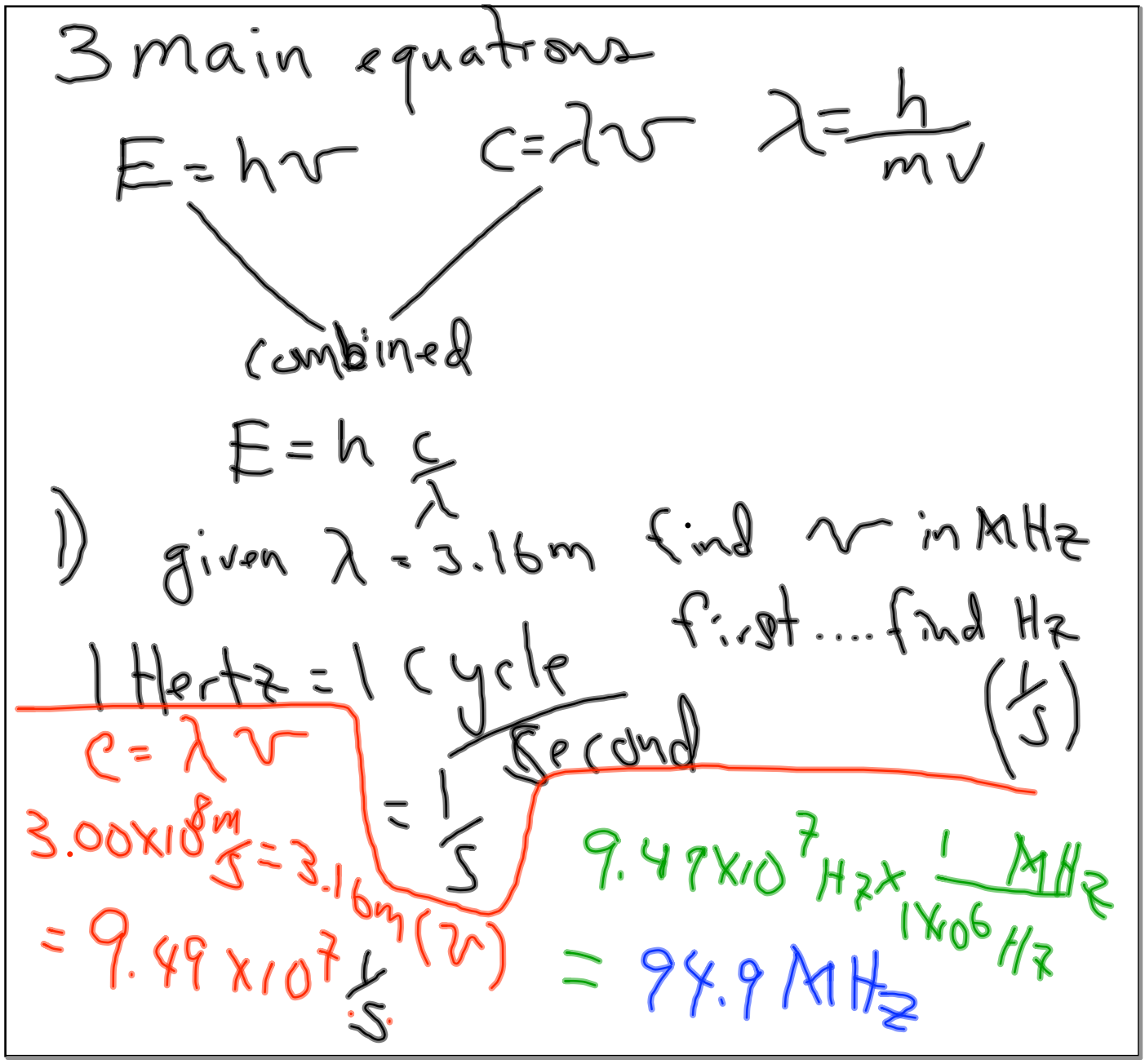

3 main equations
$E = h\nu$
$c = \lambda\nu$
$\lambda = \frac{h}{mv}$
combined
$E = h\frac{c}{\lambda}$
1) given $\lambda = 3.16\,m$ find ν in MHz
first .... find Hz
1 Hertz = 1 cycle / second $\left(\frac{1}{s}\right)$
$c = \lambda\nu$
$3.00 \times 10^8 \frac{m}{s} = 3.16\,m(\nu)$
$= \frac{1}{s}$
$= 9.49 \times 10^7 \frac{1}{s}$
$9.49 \times 10^7\,Hz \times \frac{1\,MHz}{1 \times 10^6\,Hz}$
$= 94.9\,MHz$

$$\frac{\frac{m}{s}}{m} = \frac{m}{s} \cdot \frac{1}{m} = \frac{1}{s}$$

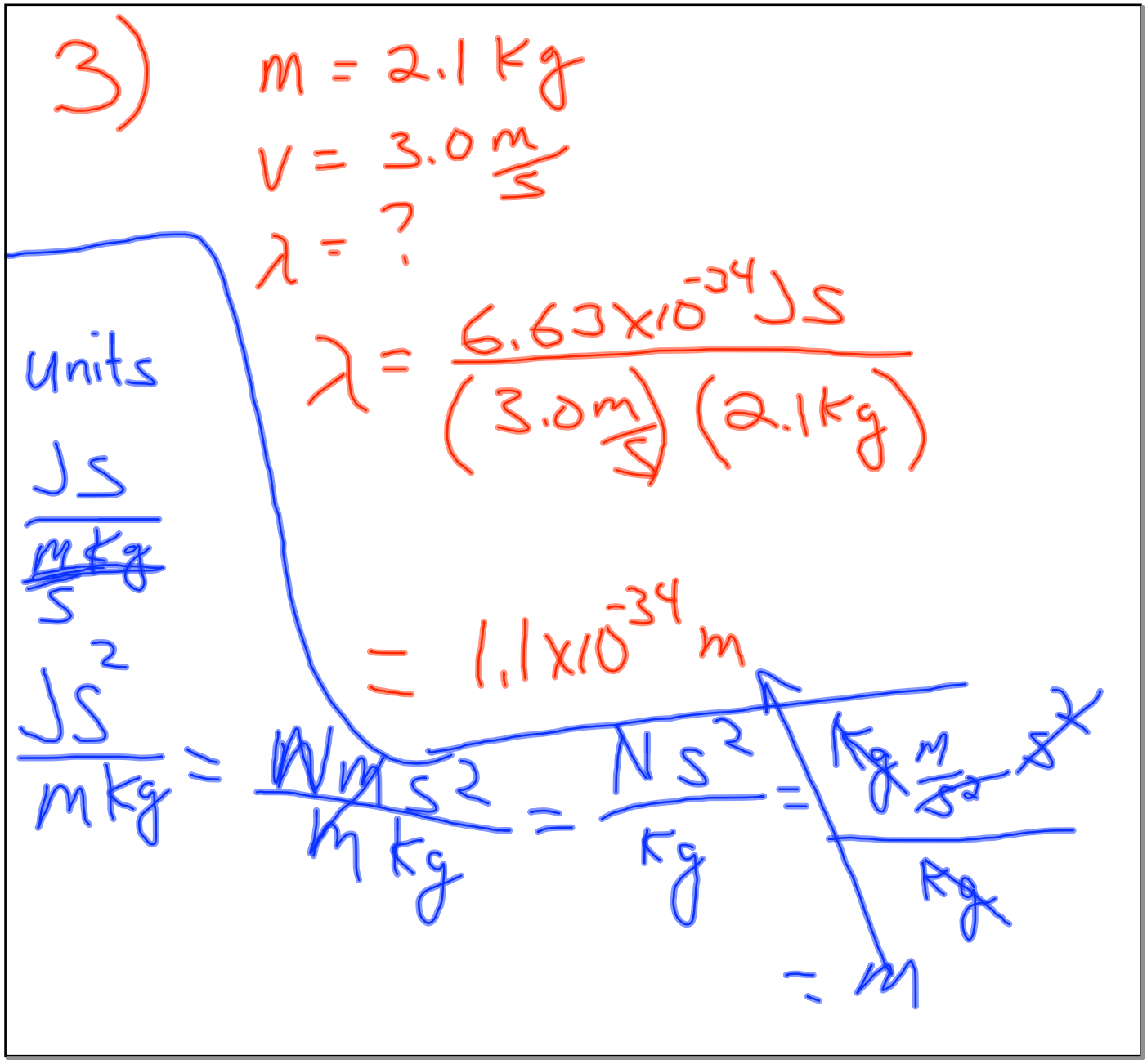
2) $E = 3.16 \times 10^{-19}\,J$ $\quad \lambda = ?$

$E = \frac{hc}{\lambda}$ so $\lambda = \frac{hc}{E}$

$$\frac{J}{Hz} = \frac{J}{\frac{1}{s}} = J \cdot \frac{s}{1} = Js$$

$$\lambda = \frac{(6.63 \times 10^{-34}\,Js)(3 \times 10^{8}\,m/s)}{3.19 \times 10^{-19}\,J}$$

$$= 6.24 \times 10^{-7}\,m$$


3)
m = 2.1 kg
v = 3.0 m/s
λ = ?
λ = 6.63x10^-34 Js / (3.0 m/s)(2.1 kg)
= 1.1x10^-34 m
Units
Js / (kg m/s)
Js^2 / mkg = Nms^2 / mkg = Ns^2 / kg = kg m/s^2 s^2 / kg
= m

15% = 4.5

85% = 8.3

so you could say...

15 = 4.5 & 85 = 8.3

$$Avg = \frac{15(4.5) + 85(8.3)}{100}$$

Divide before 100....

.15(4.5) + .85(8.3) = Avg

= 7.7 class avg

5) Ab. (mass) + Ab (mass) = Avg.

$x(20) + y(24.3) = 23.5$

$x + y = 1$

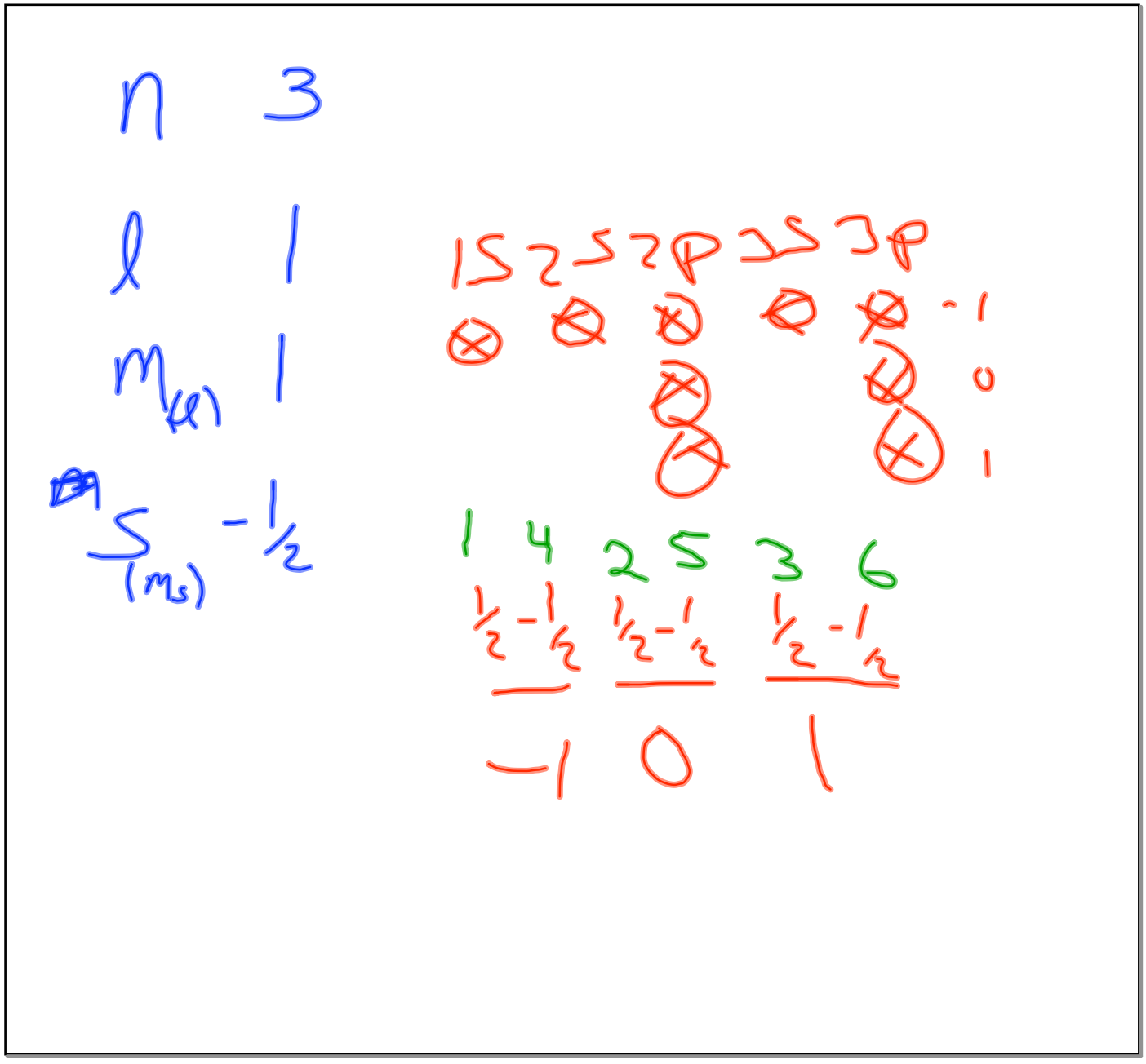
$y = (1 - x)$

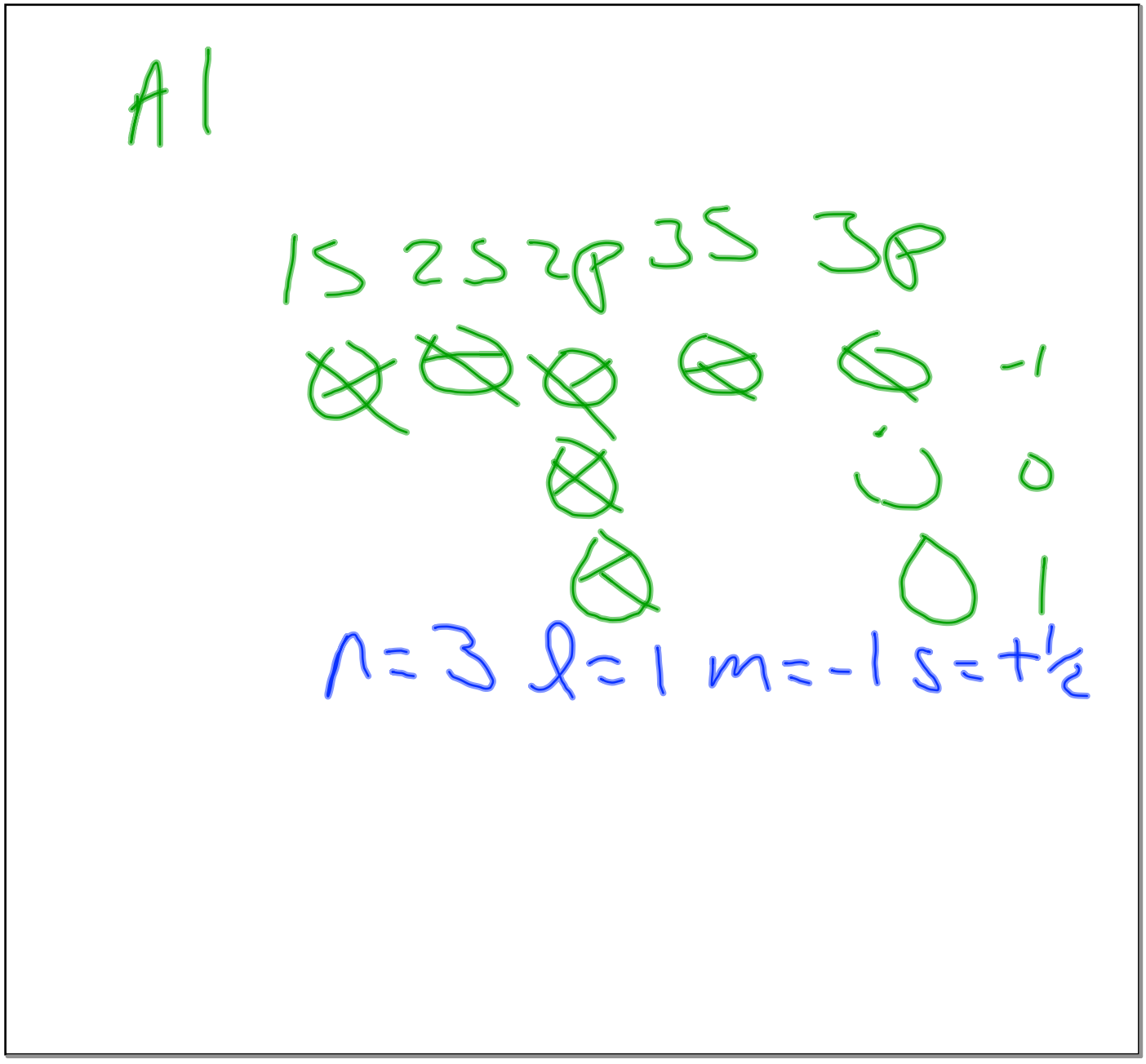
$x(20) + (1-x)24.3 = 23.5$

$20x + 24.3 - 24.3x = 23.5$

$-4.3x = -.8$

$x = .185$


n 3
l 1
$m_{(l)}$ 1
$s_{(m_s)}$ $-\frac{1}{2}$
1s 2s 2p 3s 3p
+1
0
-1
1 4 2 5 3 6
$\frac{1}{2}$ $-\frac{1}{2}$ $\frac{1}{2}$ $-\frac{1}{2}$ $\frac{1}{2}$ $-\frac{1}{2}$
−1 0 1


Al
1s 2s 2p 3s 3p
-1
0
1
n=3 l=1 m=-1 s=+½