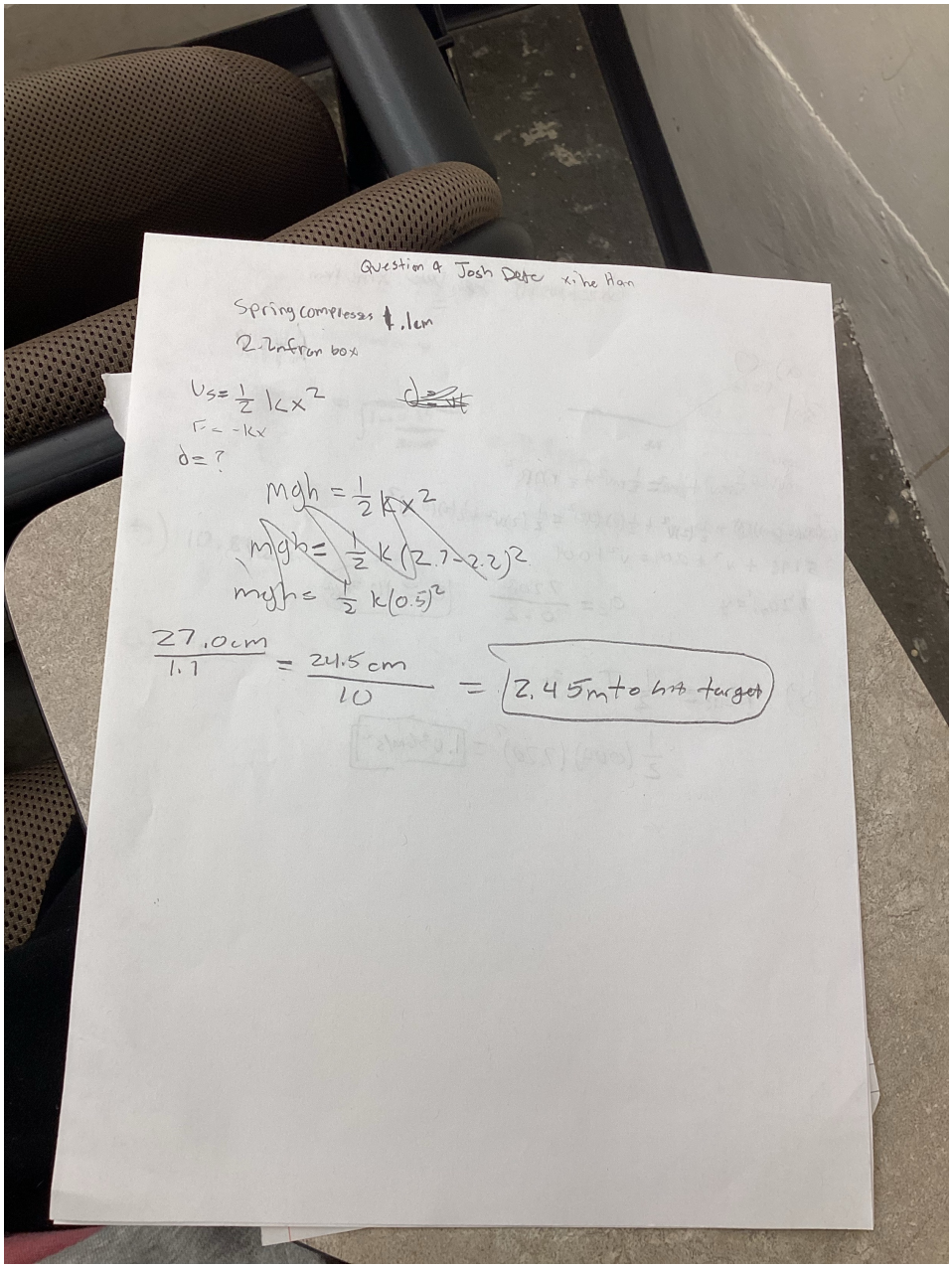

Question 4 Josh Date Xihe Han
Spring compresses 0.1cm
2.2m from box
$U_s = \frac{1}{2}kx^2$
$F = -kx$
$d = ?$
$mgh = \frac{1}{2}kx^2$
$mgh = \frac{1}{2}k(2.7-2.2)^2$
$mgh = \frac{1}{2}k(0.5)^2$
$\frac{27.0cm}{1.1} = \frac{24.5cm}{10} =$ 2.45m to 4th target

Question 12 Josh Dar Xihe Han

Question 10 Josh Dear Xihe Han

a)

$mgh + \frac{1}{2}mv^2 + \frac{1}{2}mR^2 = \frac{1}{2}mv^2 + \frac{1}{2}mR^2$

$(2)(10)(\cos(30))(3) + \frac{1}{2}(2)v^2 + \frac{1}{2}(2)(0.2)^2 = \frac{1}{2}(2)v^2 + \frac{1}{2}(2)(0.2)^2$

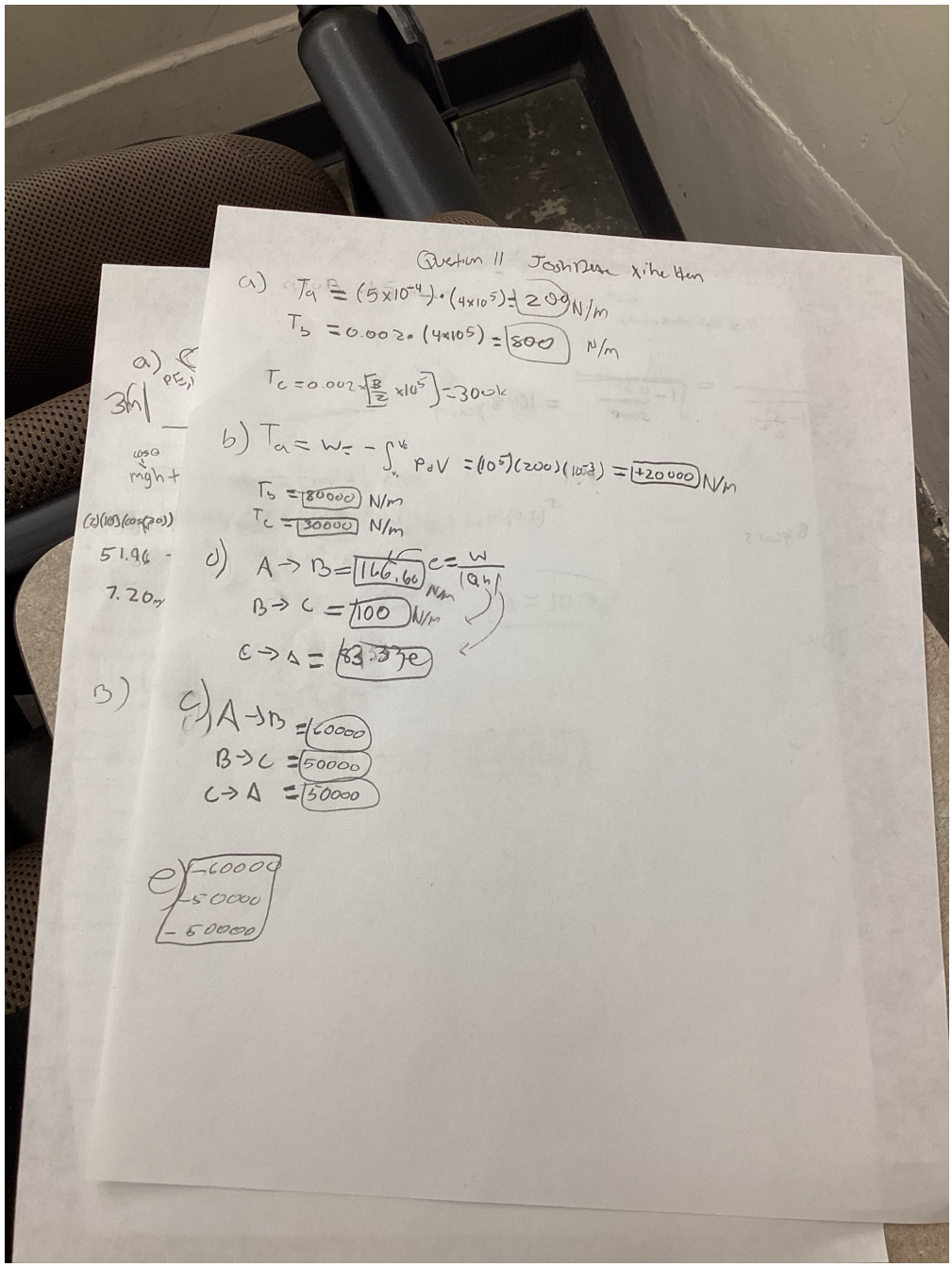
$51.96 + v^2 + 0.04 = v^2 + 0.04$

$7.20\ m/s = v$

$a_c = \frac{7.20^2}{0.2}$ $\quad a \simeq 10.3\ m/s^2$

b) $KE_R = \frac{1}{2} I w^2$

$\frac{1}{2}(0.04)(7.20)^2 = \boxed{1.036\ m/s^2}$



Question 11 Joshua Xiahan

a) $T_A = (5\times10^{-4})\cdot(4\times10^5) = 200$ N/m

$T_B = 0.002\cdot(4\times10^5) = 800$ N/m

$T_C = 0.002\sqrt{\frac{B}{2}\times10^5} = 300$ K

b) $T_A = W_{in} - \int_{V_i}^{V_f} P\,dV = (10^5)(200)(10^{-3}) = +20000$ N/m

$T_B = 80000$ N/m

$T_C = 30000$ N/m

d) $A \to B = 166.66$ $e = \frac{W}{|Q_h|}$ N/m

$B \to C = 100$ N/m

$C \to A = 83.33$

c) $A \to B = 60000$

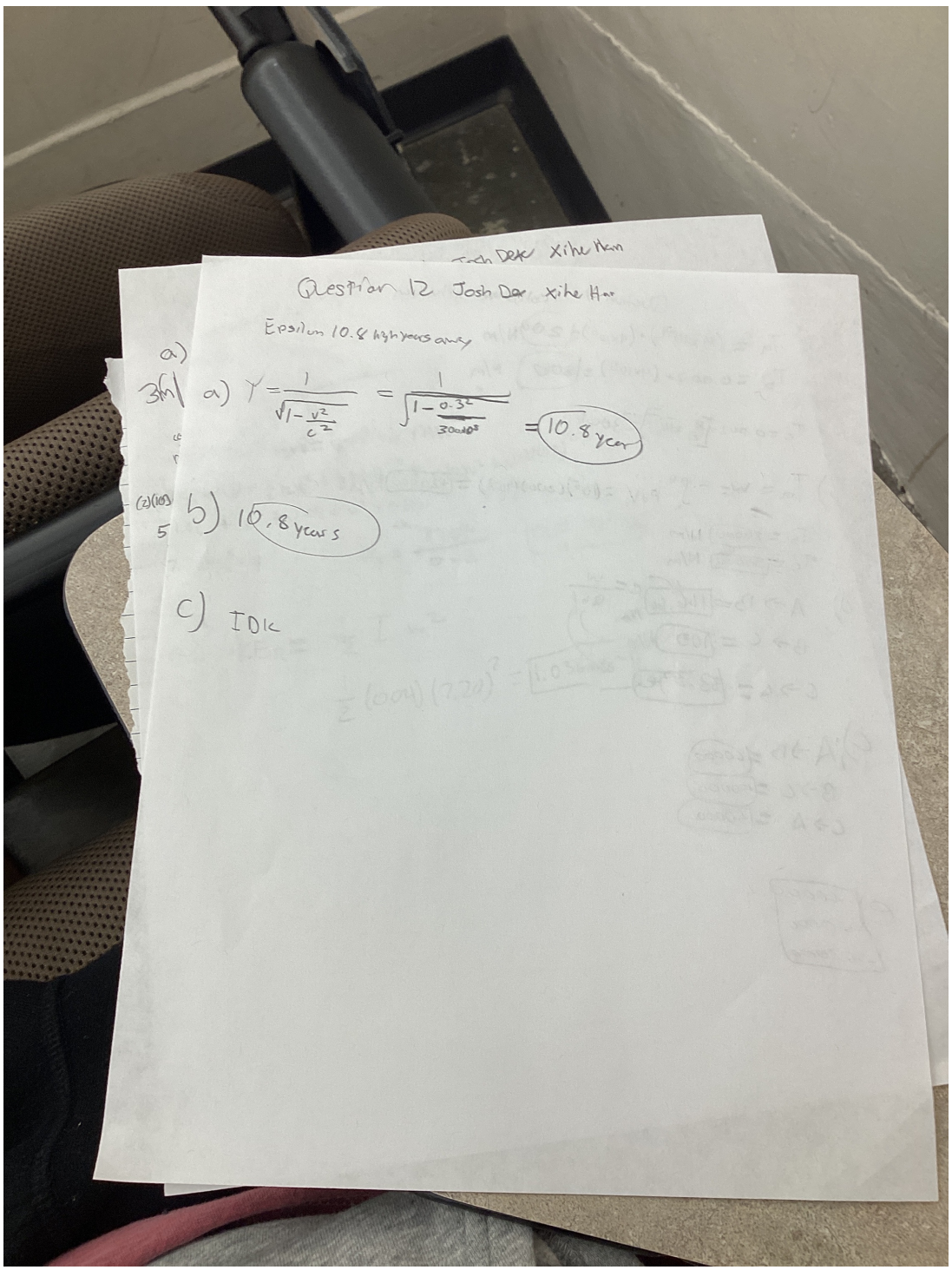
$B \to C = 50000$

$C \to A = 50000$

e) -60000

-50000

-50000


Question 12 Josh Dar Xihe Han
Epsilon 10.8 light years away
a) $\gamma = \frac{1}{\sqrt{1-\frac{v^2}{c^2}}} = \frac{1}{\sqrt{1-\frac{0.3c}{3.0\times10^8}}} = 10.8$ years
b) 10.8 years
c) IDK