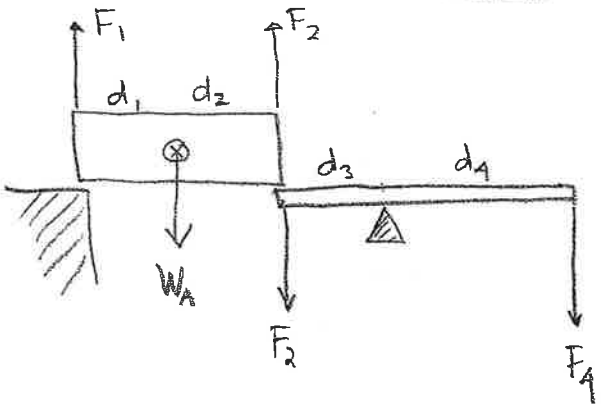
(6.3) Lever and rock problem



Is $\frac{W_A}{F_4} \stackrel{?}{=} \frac{d_4}{d_3} \quad \frac{d_1+d_2}{d_1}$

1) $\frac{x}{d_3} = \frac{d_1}{d_1+d_2}$ (definition of distance x)

2) $W_A = F_1 + F_2$ (for equilibrium)

3) $\frac{F_1}{F_2} = \frac{d_2}{d_1}$ (law of lever)

4) $\frac{F_1+F_2}{F_2} = \frac{d_1+d_2}{d_1}$ (adding 1 to 3)

5) $\frac{W_A}{F_2} = \frac{d_3}{x}$ (by 1 2 & 4)

6) $\frac{F_2}{F_4} = \frac{d_4}{d_3}$ (law of lever)

7) $\frac{W_A}{F_4} = \frac{d_4}{x}$ (multiplying 5 & 6)

8) $\frac{d_4}{x} = \frac{d_4}{d_3} \quad \frac{d_3}{x}$ (identity)

9) $\frac{d_4}{x} = \frac{d_1+d_2}{d_1} \quad \frac{d_4}{d_3}$ (by 1 & 8)

10) $\frac{W_A}{F_4} = \frac{d_4}{d_3} \quad \frac{d_1+d_2}{d_1}$ (by 7 & 9)

yes!