Acceleration

$a = \frac{\Delta V}{\Delta t}$ $\quad \Delta V = V_2 - V_1$

$V_{ave} = \frac{\Delta d}{\Delta t}$ $\quad V_{ave} = \frac{V_1 + V_2}{2}$ ← ONLY IF CONSTANT ACCELERATION!

Maybe useful:

① $\Delta d = V_1 t + \frac{1}{2} a t^2$

② $\Delta d = V_2 t - \frac{1}{2} a t^2$

③ $V_2^2 = V_1^2 + 2a\Delta d$

Kinematics problem solving:

① GRASP!

② 5 kinematics variables ($V_1, V_2, a, \Delta t, \Delta d$)

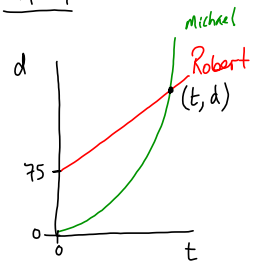
→ if you know any 3 variables, you can find the other 2.

③ watch directions and signs

④ any object falling (neglecting air resistance)

$a = -9.81 m/s^2$ or $\vec{a} = 9.81 m/s^2$ [down]

PP|89|5



Robert

constant velocity 4.2m/s

$v = \frac{\Delta d}{\Delta t}$

$\Delta d = v \Delta t$

$d - 75 = 4.2(t - 0)$

$d = 4.2t + 75$

Michael

Constant Acceleration $0.15 m/s^2$

$V_1 = 3.8 m/s$

$\Delta d = V_1 t + \frac{1}{2} a t^2$

$d = 3.8t + 0.075t^2$

Robert Michael

$4.2t + 75 = 3.8t + 0.075t^2$

$0 = 0.075t^2 - 0.4t - 75$

$a = 0.075$

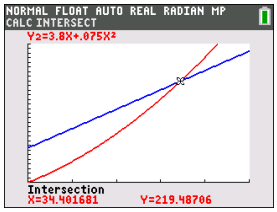
$b = -0.4$

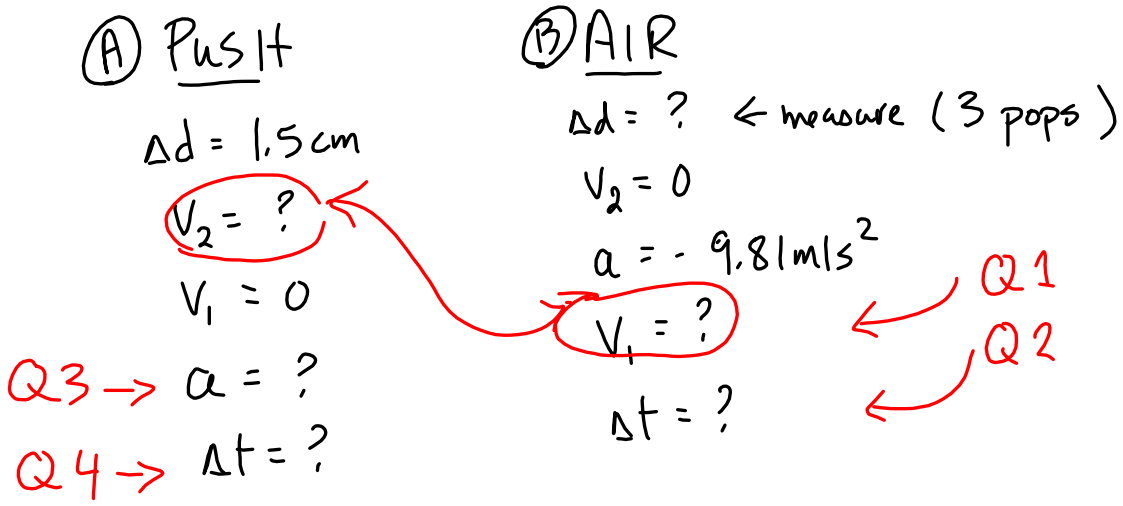
$c = -75$

$t = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$t = \frac{0.4 \pm \sqrt{(-0.4)^2 - 4(0.075)(-75)}}{2(0.075)}$

$t = ?$




(A) Push
Δd = 1.5 cm
V_2 = ?
V_1 = 0
Q3 → a = ?
Q4 → Δt = ?
(B) AIR
Δd = ? ← measure (3 pops)
V_2 = 0
a = -9.81 m/s²
V_1 = ?
Δt = ?
Q1
Q2