

02- definitions: * Use 1 mi = 1 mile = 1.61 Km = 1610 m

1. Given: $\Delta v = 35.3 \frac{\text{mi}}{\text{hr}} = 35.3 \frac{\text{mi}}{\text{hr}} \left(\frac{1 \text{ hr}}{3600 \text{ s}} \right) \left(\frac{1610 \text{ m}}{1 \text{ mi}} \right)$
 $= 15.787 \text{ m/s}$

$\Delta t = 4.3 \text{ s}$

$a = \frac{\Delta v}{\Delta t}$ formula sheet

Want: $a = \frac{\Delta v}{\Delta t} = \frac{15.787}{4.3} = 3.67 \frac{\text{m}}{\text{s}^2} = a$

2. $v = \frac{\Delta l}{\Delta t}$ → want Δt

$\Delta l = 2\pi r = 2\pi(3.1 \text{ mi}) \left(\frac{1610 \text{ m}}{1 \text{ mi}} \right)$
 $\Delta l = 31359 \text{ m}$

$v = 51 \frac{\text{mi}}{\text{hr}} = 51 \text{ mph}$

$v = 51 \text{ mph} \left(\frac{.447 \text{ m/s}}{\text{mph}} \right)$

$v = 22.8 \text{ m/s}$

Convert 1mph to m/s:

$1 \frac{\text{mi}}{\text{hr}} \left(\frac{1610 \text{ m}}{\text{mi}} \right) \left(\frac{\text{hr}}{3600 \text{ s}} \right)$

$1 \text{ mph} = .447 \text{ m/s}$

$\Delta t = \frac{\Delta l}{v} = \frac{31359 \text{ m}}{22.8 \text{ m/s}} = 1376 \text{ sec}$

$\Delta t = 1376 \text{ s} \left(\frac{1 \text{ min}}{60 \text{ s}} \right) = 23 \text{ min} = \Delta t$

3. $\Delta v = v_f - v_i = 24.2 - 21.3 = 2.9 \text{ mph} \left(\frac{.447 \text{ m/s}}{1 \text{ mph}} \right)$
 $\Delta t = 1.4 \text{ s}$

$a = \frac{\Delta v}{\Delta t} = \frac{(2.9)(.447)}{1.4} = .926 \text{ m/s}^2 = a$

4. $\Delta v = v_f - v_i = 5.66 - -3.28 = 8.94 \frac{\text{mi}}{\text{hr}}$
 $\Delta t = 1.92 \text{ s} \rightarrow$

$a = \frac{\Delta v}{\Delta t} = \frac{8.94 \frac{\text{mi}}{\text{hr}}}{1.92 \frac{\text{s}}{\text{hr}}} = 4.66 \frac{\text{mi}}{\text{hr} \cdot \text{sec}}$