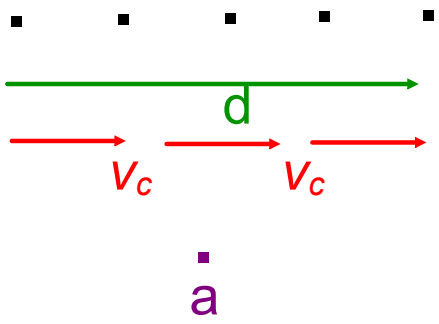
How far away is an explosion if it takes sound 8.33 minutes to reach you?

How far away is an explosion if it takes sound 8.33 minutes to reach you?



How far away is an explosion if it takes sound 8.33 minutes to reach you?

$d = ?$

$t = 8.33\,min \rightarrow 500.\,s$

$v_s = 340.\,m/s$

$d = vt = 340.\,m/s\,(500.\,s)$

$d = 1.70 \times 10^5\,m$

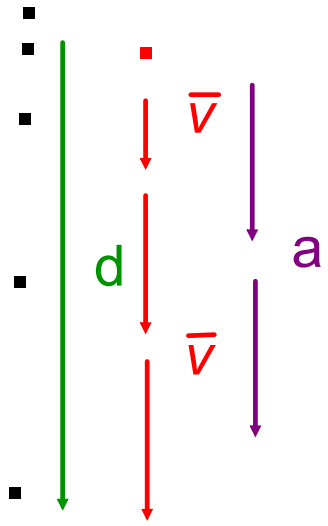
$m/s \times s = m$

$\therefore\ v = d/t$

$d = vt$

How far does a rock fall if it was dropped out a window and lands 2.5 s later?

How far does a rock fall if it was dropped out a window and lands 2.5 s later?



How far does a rock fall if it was dropped out a window and lands 2.5 s later?

$d_y = ?$
$v_1 = 0$
$t = 2.5\,s$
$g = -9.8\,m/s^2$

$\bar{v} = d/t$
$d = \bar{v}\,t$
$d = \bar{v}(2.5\,s)$
$d = -13\,m/s\,(2.5\,s)$
$d = -33\,m$

$a = \Delta v/t$
$v_2 = v_1 + at$
$v_2 = 0 + (-9.8\,m/s^2)(2.5\,s)$
$v_2 = -25\,m/s$
$\therefore \bar{v} = \frac{0 + (-25\,m/s)}{2}$
$\bar{v} = -13\,m/s$

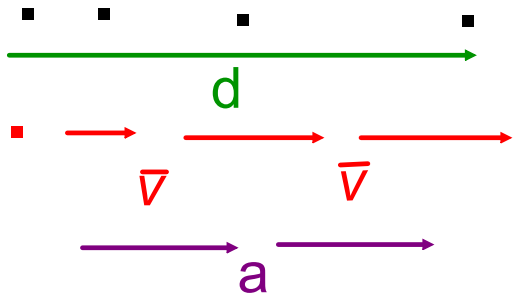
$T\ m?$
$a \therefore a = \Delta v/t$
$\bar{v} = d/t$

Little Anthony accelerates from rest to 28 km/hr in 4.4 s. a) What is his final speed in m/s?

What is his acceleration?…

How far did he go?

Little Anthony accelerates from rest to 28 km/hr in 4.4 s. a) What is his final speed in m/s?



What is his acceleration?…

How far did he go?

Little Anthony accelerates from rest to 28 km/hr in 4.4 s. a) What is his final speed in m/s?

$v_1 = 0$

$v_2 = 28 km/hr$ → 7.8 m/s

$t = 4.4 s$

$28 \frac{km}{hr} \left(\frac{1000 m}{1 km}\right)\left(\frac{1 hr}{3600 s}\right)$

$v_2 = 7.8 m/s$

$v_2 = ?$ What is his acceleration?…

TM acc

$a = \frac{\Delta v}{t} = \frac{v_2 - v_1}{t} = \frac{7.8 m/s - 0}{4.4 s} = 1.8 m/s^2$

How far did he go?

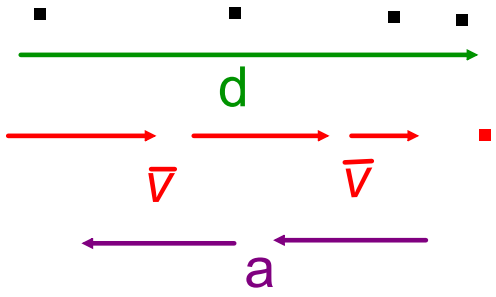
$\bar{v} = d/t$

you can put the definition of $\bar{v}$ into $\bar{v} = d/t$

$d = \bar{v} t = \left[\frac{0 + 7.8 m/s}{2}\right] 4.4 s = 17 m$

A 27 g rock thrown at 34 m/s hits a tree and stops in 0.67 cm. What deceleration did it experience?

A 27 g rock thrown at 34 m/s hits a tree and stops in 0.67 cm. What deceleration did it experience?



A 27 g rock thrown at 34 m/s hits a tree and stops in 0.67 cm. What deceleration did it experience?

m = 27 g

v_1 = 34 m/s

v_2 = 0

d = 0.0067 m

a = ?

TM? accel.

$\bar{v} = \Delta d_t/t$

$\bar{v} = (v_1 + v_2)/2$

$a = \Delta v/t$

$a = \Delta v/t = (v_2 - v_1)/t$

$a = (0 - 34 \text{ m/s})/t$ 2 variables

$a = (-34 \text{ m/s})/.00039 \text{ s}$

$a = -87{,}000 \text{ m/s}^2$

$\bar{v} = \Delta d_t/t$

$t = \Delta d/\bar{v}$

$t = 0.0067 \text{ m}/17 \text{ m/s}$

$t = .00039 \text{ s}$

$\bar{v} = (v_1 + v_2)/2$

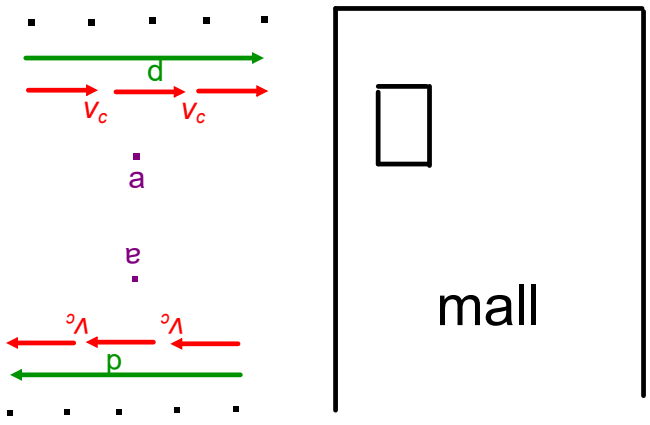
$\bar{v} = (34 \text{ m/s} + 0)/2$

$\bar{v} = 17 \text{ m/s}$

How far are you away from a shopping if you yell "hello" and hear your echo 3.4 s later?… (remember the sound goes to the shopping center and reflects back to you)

.

How far are you away from a shopping if you yell "hello" and hear your echo 3.4 s later?… (remember the sound goes to the shopping center and reflects back to you)



How far are you away from a shopping if you yell "hello" and hear your echo 3.4 s later?… (remember the sound goes to the shopping center and reflects back to you)

$= 3.4\ s$

$\therefore t_{1\ way} = 1.7\ s$

$v_s = 340\ m/s$

$v = d/t$

$d = v\,t$

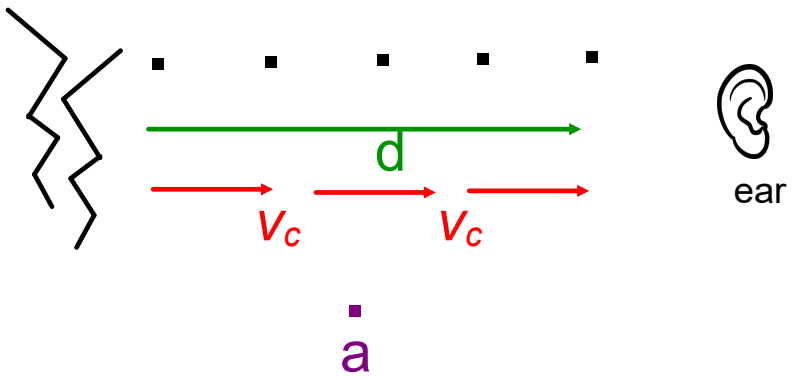
$d = 340\ m/s\ (1.7\ s)$

$d = 580\ m$

$v_s \therefore v = d/t$

How far away did lightning strike if you see the flash and hear the thunder 5.0s later?

How far away did lightning strike if you see the flash and hear the thunder 5.0s later?



How far away did lightning strike if you see the flash and hear the thunder 5.0s later?

$d_1 = ?$

$t = 5.0\,s$

$v_s = 340\,m/s$

$v_s = d/t$

$d_s = v_s t = 340\,m/s\,(5.0\,s)$

$d_s = 1700\,m$

TM? v_c

$\therefore v = d/t$

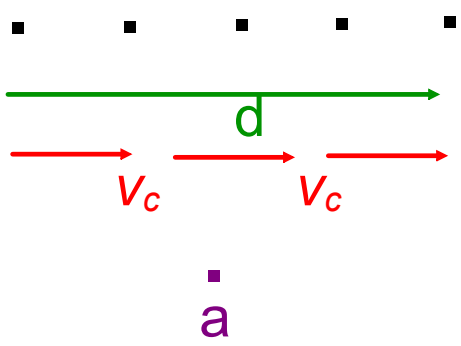
$v_l = 3.0 \times 10^8\,m/s$

$v_l = d/t$

$t = d/v_l = \frac{1700\,m}{3\times10^8\,m/s} = 5.7\times10^{-6}\,s$

Sound travels at 1500 m/s in water. How far away is a little boy if you see him bang two rocks together under water and you hear it 2.5 s later (you're under water too)?

Sound travels at 1500 m/s in water. How far away is a little boy if you see him bang two rocks together under water and you hear it 2.5 s later (you're under water too)?



Sound travels at 1500 m/s in water. How far away is a little boy if you see him bang two rocks together under water and you hear it 2.5 s later (you're under water too)?

$v = d/t$

$v_{H_2O} = 1500\ m/s$

$d = ?$

$t = 2.5\ s$

$d = vt = 1500\ m/s\,(2.5\ s)$

$d = 3800\ m$

$T\ m?\ v_c$

$\therefore v = d/t$

in air

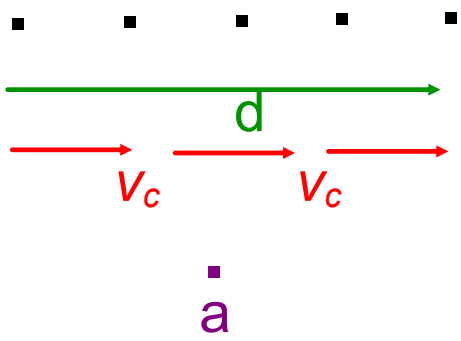
$v = d/t$

$t = d/v = \frac{3800\ m}{340\ m/s}$

$t = 1.1\ s$

You see lightning strike a tree 16.8×10^2 m away and hear the thunder 4.85 s later. What do you calculate the speed of sound to be?…..

You see lightning strike a tree 16.8 x 10^2 m away and hear the thunder 4.85 s later. What do you calculate the speed of sound to be?…..



You see lightning strike a tree 16.8 x 10^2 m away and hear the thunder 4.85 s later. What do you calculate the speed of sound to be?…..

$d = 1680\ m$

$t = 4.85\ s$

$v_s = ?$

$T\ m : v_c$

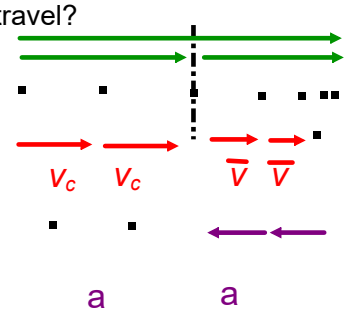
$\therefore\ v = d/t$

$v_s = d/t = \frac{1680\ m}{4.85\ s}$

$v_s = 346\ m/s$

A car traveling at 75 km/hr sees an accident and slams on his brakes and skids to rest in 3.4 seconds. From the time he saw the accident and then hit his brakes the reaction time was 0.74 seconds. a) How far did he travel during his reaction time? ... b) How far did he travel during the actual braking? ...c) What total distance did he travel?

A car traveling at 75 km/hr sees an accident and slams on his brakes and skids to rest in 3.4 seconds. From the time he saw the accident and then hit his brakes the reaction time was 0.74 seconds. a) How far did he travel during his reaction time? ... b) How far did he travel during the actual braking? ...c) What total distance did he travel?



A car traveling at 75 km/hr sees an accident and slams on his brakes and skids to rest in 3.4 seconds. From the time he saw the accident and then hit his brakes the reaction time was 0.74 seconds. a) How far did he travel during his reaction time? ... b) How far did he travel during the actual braking? ...c) What total distance did he travel?

$v_1 = 75\ km/h \rightarrow 21\ m/s$

$v_2 = 0$

$t_a = 3.4\ s$

$t_R = .74\ s$

Reaction: d_R

d_a ? accel $\therefore a = \Delta v / t$

Reaction

$v_c = d/t$

$d_R = vt = 21\ m/s\ (.74\ s)$

$d_r = 16\ m$

$\bar{v} = d/t$

$d = \bar{v} t$

$d_a = \left(\frac{21\ m/s + 0}{2}\right) 3.4\ s$

$d_a = 36\ m$

$d_T = 16\ m + 36\ m = 52\ m$