Read 3.3

H.W #2 Due today

H.W #3 available

Lots of office hours today

11:30 - 12:30 me

12:30 - 1:30, 2:30 - 4:30 Jinfeng

4:30 - 5:30 mike

Interactive Question

E

Consider the equation $A = 1/B^2$. What happens to A if you double B?

A) A doubles
B) A stays the same
C) A decreases to 1/2 its initial value
D) A decreases to $1/\sqrt{2}$ its initial value
E) A decreases to 1/4 its initial value

Problem: Consider the equation $A = 1/B^2$. What happens to B if you double A?

$A = \frac{1}{B^2}$

$B^2 = \frac{1}{A}$ $\quad B = \sqrt{\frac{1}{A}}$

$\sqrt{\frac{1}{2A}}$

$\sqrt{\frac{1}{2}}\sqrt{\frac{1}{A}}$

$\sqrt{\frac{1}{2}}B$

B decreases by $\frac{1}{\sqrt{2}}$

Problem: Two cars start at rest and accelerate at the same rate. If the first car accelerates for three times the amount of time as the second car, how much faster is the first car going?

$V = V_0^{0} + at$

$V = at$

t 3 times larger

V 3 times larger

Problem: Two cars start at rest and accelerate at the same rate. If the first car accelerates for twice the amount of time as the second car, how much farther has the first car traveled?

$d = \cancel{v_0}^{0} t + \frac{1}{2} a t^2$

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

a same
$\frac{1}{2}$ constant
} neglect

if t doubles, what happens to d

$t \to 2t \qquad d = \frac{1}{2} a (2t)^2 = \underbrace{\frac{1}{2} a t^2}_{d}\, 4$

$d\ 4$

$\uparrow$

4 times farther

Interactive Question

Two cars each drive for one hour. If the first car has an average speed that is three times that of the second car, how much distance does the second car travel compared with the first car?
(Hint: Be careful. Which car travels farther)

A) The same distance
B) 3 times farther
C) 1/3 times as far
D) 9 times farther
E) 1/9 as far

Interactive Question

C

Two cars start from rest and each accelerates for the same amount of time. If the first car can accelerate at twice the rate of the second car, how much farther has the first car traveled?

A) The same distance
B) $\sqrt{2}$ times farther
C) Twice as far
D) Four times as far

Problem: Two cars start from rest and accelerate at a constant rate. If the first car can accelerate at three times the rate of the second car, how much time more time does it take the second car to travel the same distance as the first car?

(Hint: since you want time, you will need to solve an equation for time.)

$d = v_0^{\,0} t + \frac{1}{2} a t^2$

$d = \frac{1}{2} a t^2$ $\quad t^2 = \frac{2d}{a}$ $\quad t = \sqrt{\frac{2d}{a}}$

a is $\frac{1}{3}$ of 1st car

$\sqrt{\frac{2d}{\frac{a}{3}}} = \sqrt{3}\underbrace{\sqrt{\frac{2d}{a}}}_{t}$

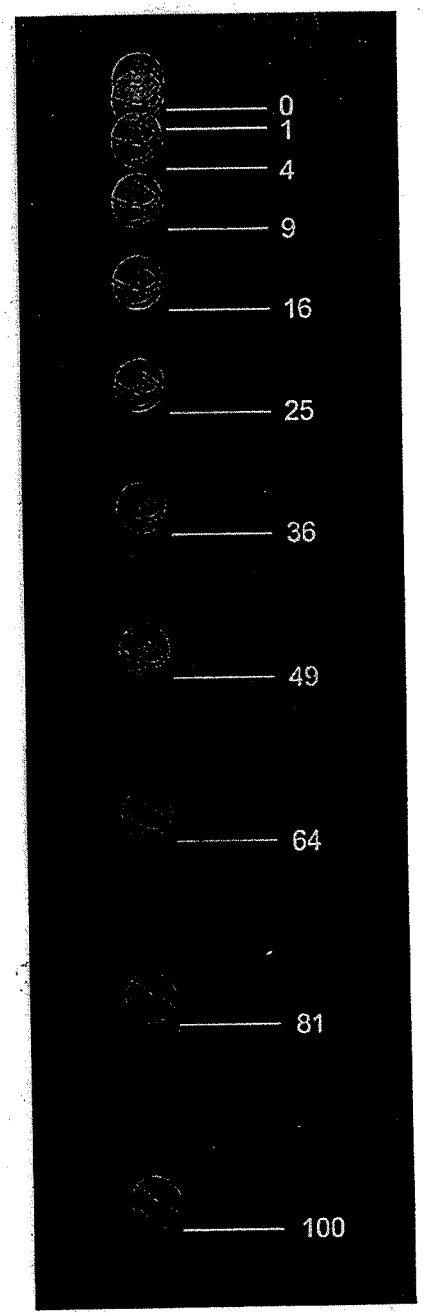
$\sqrt{3}\,t$

$\sqrt{3}$ more time

Interactive Question

(A)

Consider the ball falling in the picture to the right. A snapshot of the ball is shown at equal time intervals. What is true about the motion of the ball?



A) The ball is speeding up all the time
B) The ball is falling at a constant speed
C) The ball is speeding up for a little while then falling at a constant speed
D) The ball is slowing down all the time