NO Reading Assignment
(Should have finished chp 3)

Action Center Thursday

Group problem: Projectile motion

H.W 3 Due Friday

Exam 1 Monday 7:30 A.M Here

chp 1, 2, 3

16 Questions

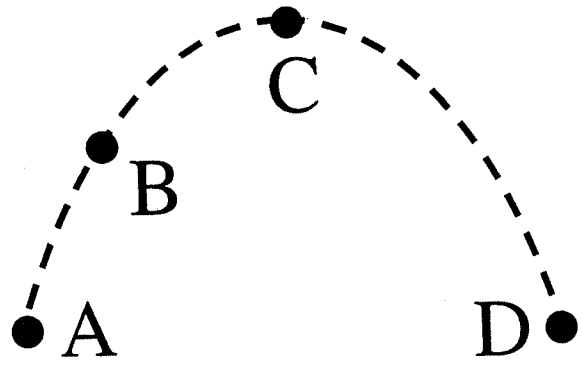
1 "free"

~$\frac{1}{2}$ concept

~$\frac{1}{2}$ calculational

Interactive Question

A tennis ball is thrown upward at an angle from point A and follows a parabolic path as shown. (The motion is shown from the time the ball leaves the person's hand until just before it hits the ground.)



At what point is the horizontal velocity equal to the horizontal velocity at A?

A) B
B) C
C) D
D) All of the above
E) None of the above

Interactive Question

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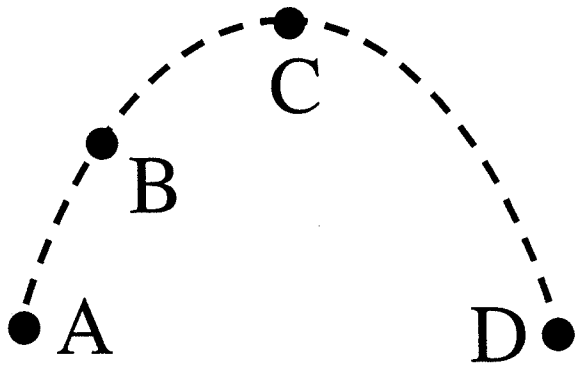

At what point is the vertical acceleration equal to zero?

A) A
B) B
C) C
D) D
E) None of the above

Interactive Question

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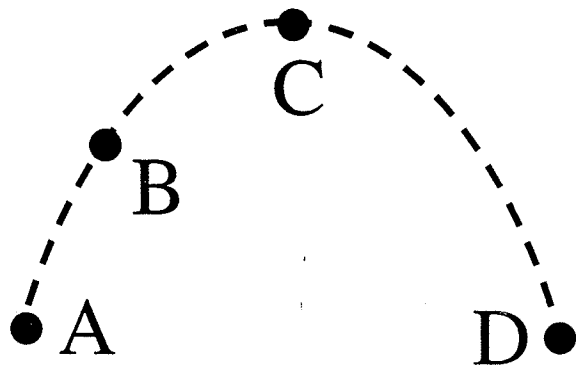

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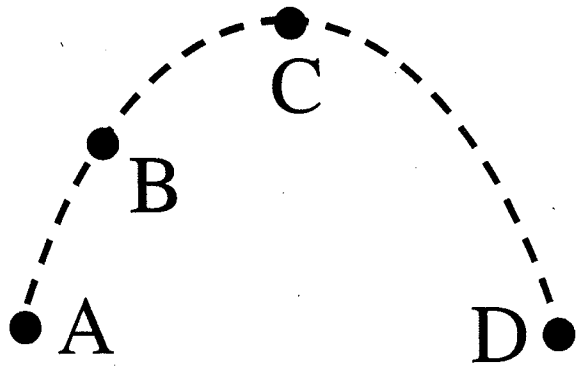

At what point is the velocity equal to zero?

A) A
B) B
C) C
D) D
E) None of the above

Interactive Question

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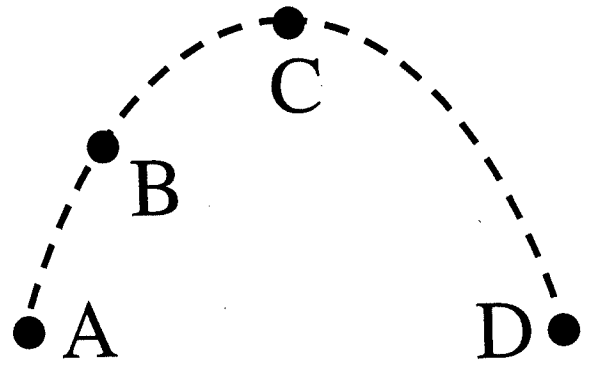


At what point is the vertical velocity equal to zero?

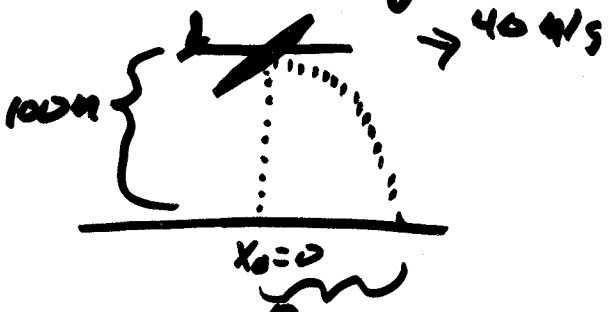
A) A
B) B
C) C
D) D
E) None of the above

ex) A plane flying at a constant velocity of 40.0 m/s drops a package at a height of 100 m above ground.

a) where does package hit ground

b) what is velocity of package when it hits ground

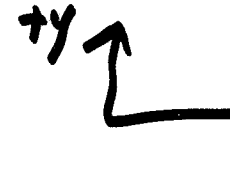
c) where is plane when package hits ground



$x = x_0 + v_x t$

$x = (40 m/s)(4.515)$

a) $\boxed{x = 180 m}$



$y = y_0 + v_{0y} t - \frac{1}{2} g t^2$

$0 = 100 m - \frac{1}{2} g t^2$

$100 m = \frac{1}{2} g t^2$

$t = \sqrt{\frac{2 \cdot 100}{g}}$

$\boxed{t = 4.515}$

c) $x = x_0 + v_{ox} t$

$x = (40 m/s)(4.515)$

$\boxed{x = 180 m}$

b) velocity

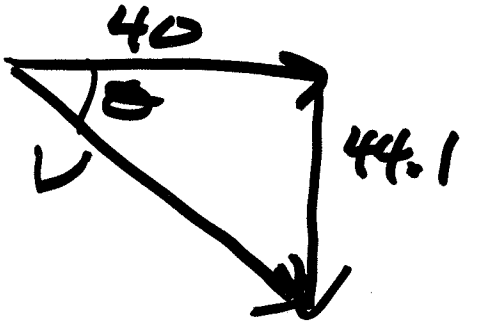
$v_x = 40\ m/s$ no acceleration in K

v_y: $v_y = v_{0y} - gt$ ($v_{0y} = 0$)

$(-9.8\ m/s^2)(4.5\ s) = -44.1\ m/s$

$|v| = \sqrt{(40\ m/s)^2 + (-44.1\ m/s)^2}$

$= 59.5\ m/s$

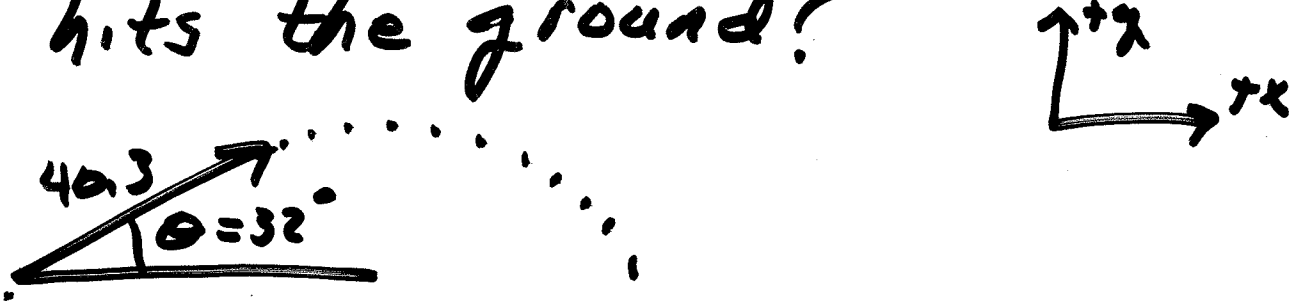


$\theta = \tan^{-1} \frac{44.1}{40}$ $\theta = 48°$ below Horizontal

Golfer hits a ball with an initial speed of 40.3 m/s at an angle of 32.0° from the horizontal

a) How far does the ball go and how long is it in the air?

b) what is the speed when it hits the ground?



$v_{0x} = v_0 \cos 32° \Rightarrow 40.3 \cos 32° = 34.2 \text{ m/s}$

$v_{0y} = v_0 \sin 32° \Rightarrow 40.3 \sin 32° = 21.4 \text{ m/s}$

$x = x_0 + v_x t = 34.2 \cdot t$

$y = y_0 + v_{0y} t - \frac{1}{2} g t^2$

$y - y_0 = v_{0y} t - \frac{1}{2} g t^2$

$0 = t\left(v_{0y} - \frac{1}{2} g t\right)$

$v_{0y} - \frac{1}{2} g t = 0$

$t = \frac{2 v_{0y}}{g}$

$$t = \frac{2 \cdot 21.4\ m/s}{9.8\ m/s^2} = \boxed{4.37\ s}$$

$$x = v_{0x} t = 34.2\ m/s \cdot 4.37\ s$$

$$\boxed{149\ m}$$

$$v_x = 34.2\ m/s$$

$$v_y = -21.4\ m/s$$

$$|v| = \sqrt{(34.2\ m/s)^2 + (-21.4\ m/s)^2}$$

$$= \boxed{40.3\ m/s}$$

Baseball player hits a ball and it lands in the seats 7.6 m above the point where ball was hit. It lands with a velocity of 49 m/s at an angle of 31° to the horizontal

a) what is initial velocity of ball when it leaves the bat?

$V_x = V\cos 31° = (49\text{ m/s})(\cos 31°) = 42\text{ m/s}$

$V_y = V\sin 31° = (49\text{ m/s})(\sin 31°) = -25\text{ m/s}$

$V_{ox} = 42\text{ m/s}$

$V_{oy} = 28\text{ m/s}$

$V = \sqrt{(42\text{ m/s})^2 + (28\text{ m/s})^2}$

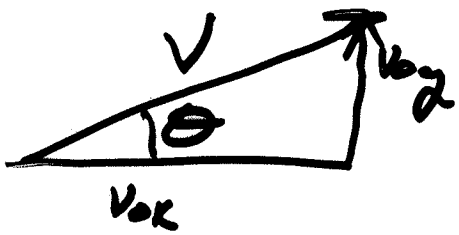
$= \boxed{50\text{ m/s}}$

$V_y^2 = V_{oy}^2 + 2a(y - y_o)$

$V_{oy}^2 = V_y^2 - 2a(y - y_o)$

$= (-25\text{ m/s})^2 - 2(-9.8\text{ m/s}^2)(7.6\text{ m})$

$V_{oy} = 28\text{ m/s}$



$\tan\theta = \frac{V_{oy}}{V_{ox}} = \frac{28\text{ m/s}}{42\text{ m/s}}$

$\theta = 34°$ above horizontal

Exam

Monday in this room

Can start at 7:30 A.M if you wish

16 multiple choice questions

1 "free"

~$\frac{1}{2}$ calculational

~$\frac{1}{2}$ concept

mostly chapters 2-3

if discussed, could be on exam

should be no surprises

vectors
graphs
velocity
acceleration (constant)
falling objects
projectile motion
⋮

Best way to prepare
understand all notes
H.W
Do extra problems in back of book
understand ideas
"change problem" slightly. Do you know answer?

practice Questions
* Do not use solutions unless absolutely necessary *

Bring a calculator and pencil

- No Books, Cell phones, Laptops etc.
- Wait outside room before 7:30 A.M
- Each exam has a seat #
  you should go to that seat
- If you have any questions during exam ASK

3 Versions of Exam A, B, C