Tuesday, 15 Jan

brought to you by the letters M O M E N T U M

Bruce Springsteen week

housekeeping

You're doing great!

Questions from QS&BB readings due on the day after the lesson

- I've extended lesson 4 through Wednesday evening

isp220@pa.msu.edu should be working now... thanks for pushing me

Any issues with MasteringPhysics? See me!

- The first MP homework will appear as if by magic on Saturday night

You should be on Facebook...I've started announcing things

You should watch the course home page which is a Wordpress blog

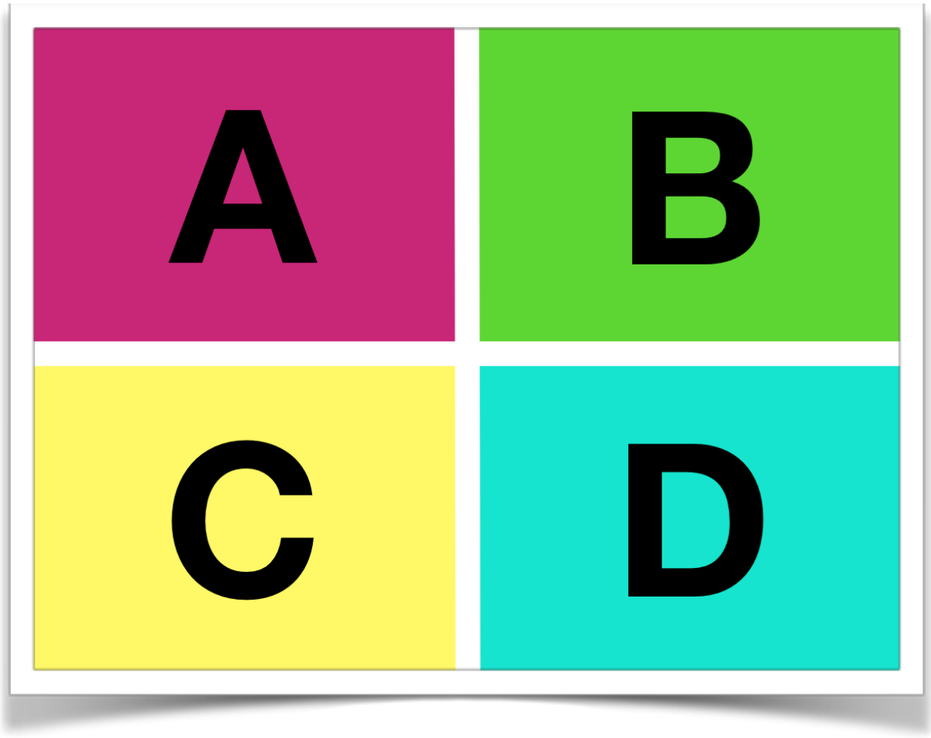
- I might say something important. Sign up for Feedburner
- for example: I just got information about refunds for folks who were offered the MasteringPhysics ebook by mistake

Katie's office hours are M&F from 4:10pm to 6pm in BPS 3208.

Remember, I'm out of town on 1/24, so no class that day

D2L

"CAPER"* cards



A

B

C

D

The routine:

1. I ask a question with responses
2. You fold your card and put it on your forehead
3. Then you defend your answer to the person next to you
4. I might then ask a second time
5. "I don't know?" …show a blank square

Bring it to class or:

There's an app for that:

https://itunes.apple.com/us/app/capercard/id843445157?mt=8
https://play.google.com/store/apps/details?id=com.hexational.capercard&hl=en

* "Center for Astronomy & Physics Education Research"

reading quiz

demonstrations

enhanced with some questions

answer, defend

frictionless cart

The constant force F creates an acceleration in which direction

A none

B right

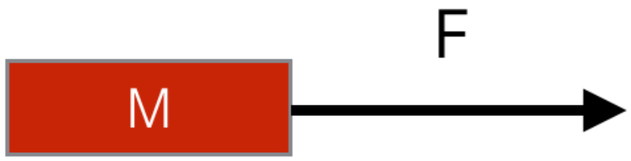
C left

D out of the board

answer, defend

If F becomes 2F, the acceleration of the cart

frictionless cart



$$F = ma$$

$$a = \frac{F}{m}$$

A doubles

B stays the same

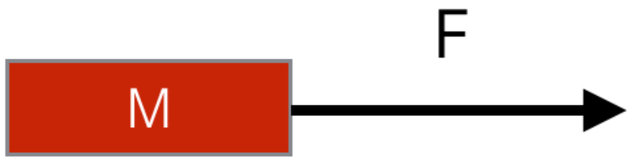
C halves

D don’t know

answer, defend

If M becomes 2M, the acceleration of the cart

frictionless cart



$$F = ma$$

$$a = \frac{F}{m}$$

A doubles

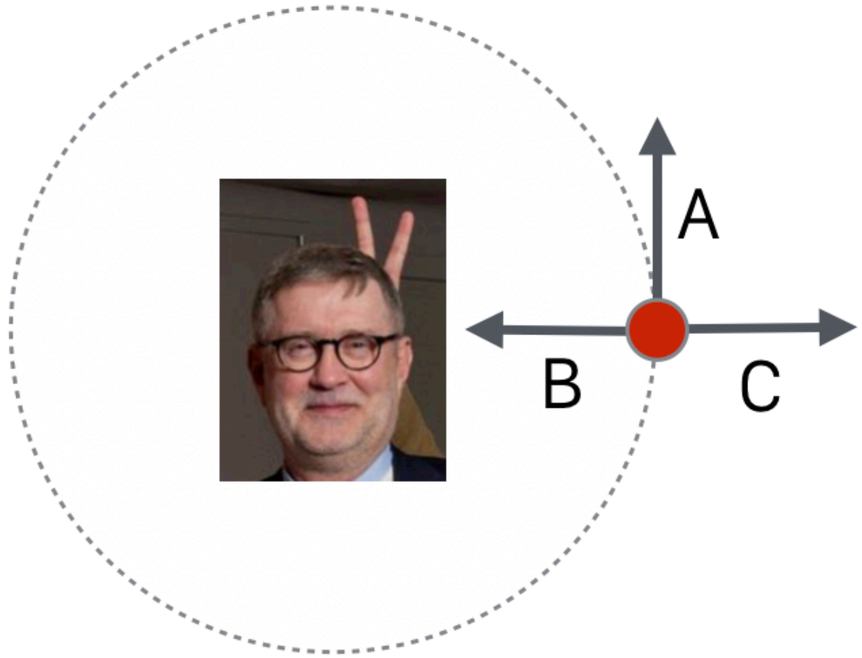
B stays the same

C halves

D don’t know

answer, defend

looking down
from above



In twirling a ball around my head, which is the centripetal force?

A

B

C

D don't know

some questions for all of us

answer, defend

An apple of 0.1 kg sits on a scale which reads in Newtons. If g = 10 m/s^2, what is the weight of the apple? That is, what does the scale read?

A 5 lbs

B 10 N

C 10 kg

D 1 N

answer, defend

An apple of 0.1 kg sits on a scale on Jupiter which reads in Newtons. If g = 25 m/s^2, what is the weight of the apple on Jupiter if the scale is calibrated on Earth? That is, what does the scale read to a Jupiterian?

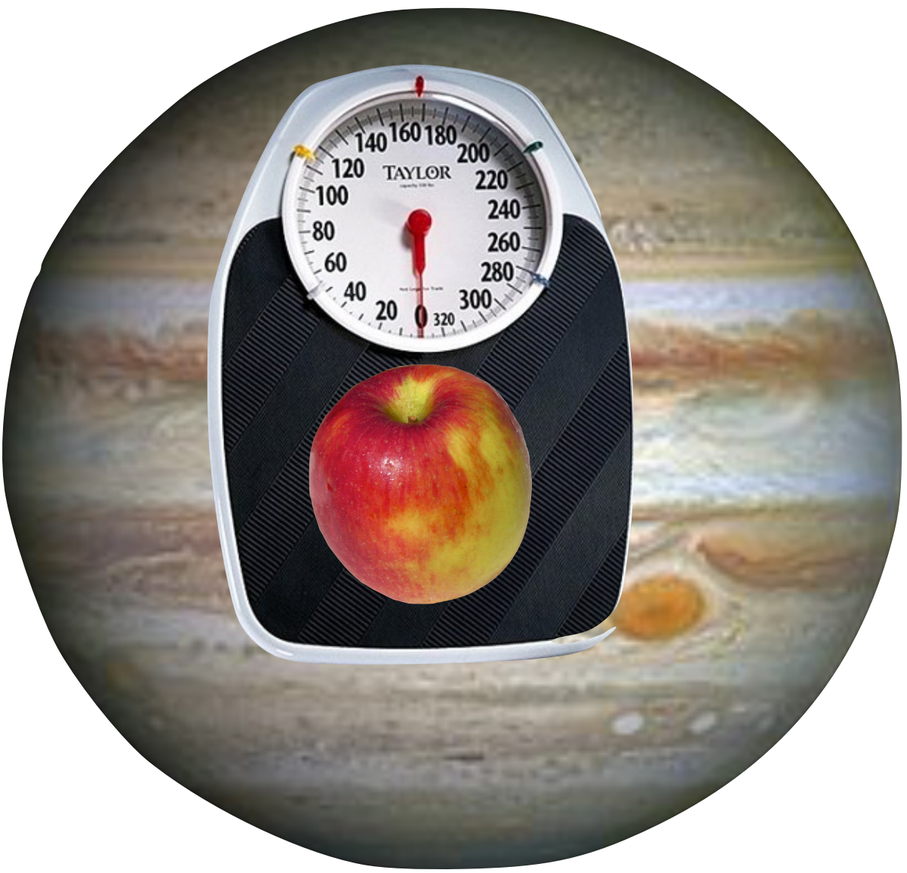
A 2.5 N

B 25 N

C 25 kg

D 10 N

answer, defend



An apple of 0.1 kg sits on a scale on Jupiter which reads in Newtons. If g = 25 m/s^2, what is the mass of the apple on Jupiter if the scale is calibrated on Earth? That is, what does the scale read to a Jupiterian?

A 2.5 N

B 1 kg

C 0.1 kg

D 2.5 kg

answer, defend

A strangely disembodied hand lifts a 0.1 kg apple with a string. The string exerts a 5 N force on the apple which has a weight of 1 N.

What force does the apple feel?

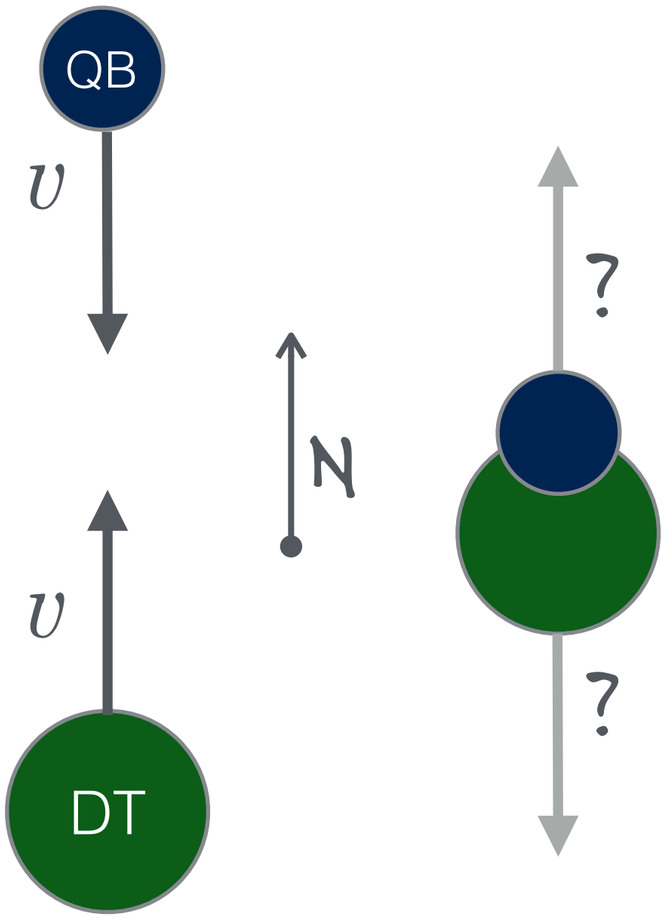
A 5 N

B 5 kg

C 4 N

D 6 N

the area “box” approach to algebra



A 350 pound defensive tackle (DT) moving North tackles (and holds) a 175 pound quarterback (QB) running at him with the same speed moving towards the South.

answer, defend

A 350 pound defensive tackle (DT) moving North tackles (and holds) a 175 pound quarterback (QB) running at him with the same speed moving towards the South.

DT

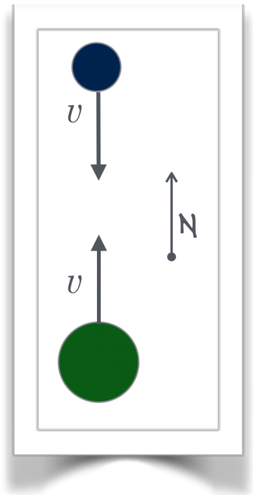
mass, DT: $m_D = 2$

v_0(DT) = 2 North

QB

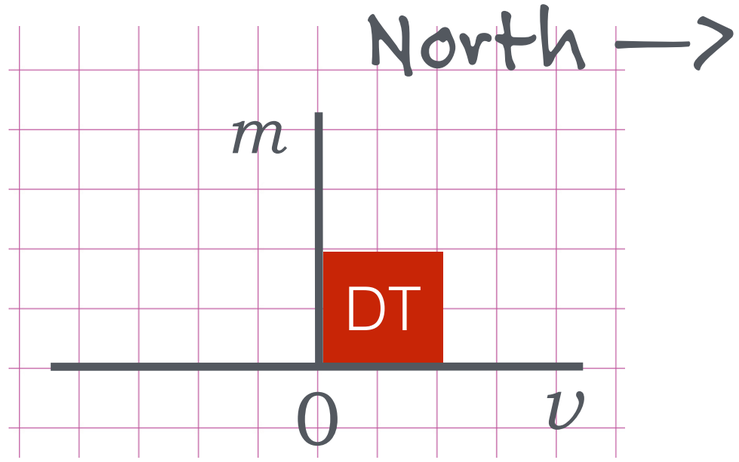
mass, QB: $m_Q = 1$

v_0(QB) = 2 South = -2 North

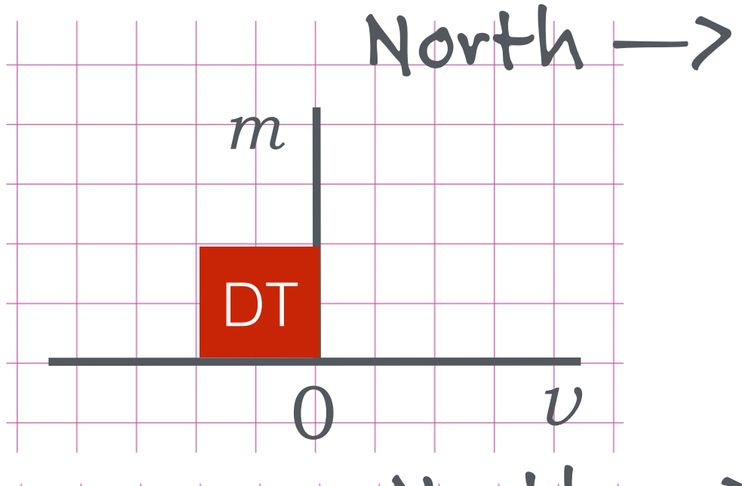


The initial DT momentum is best represented by:

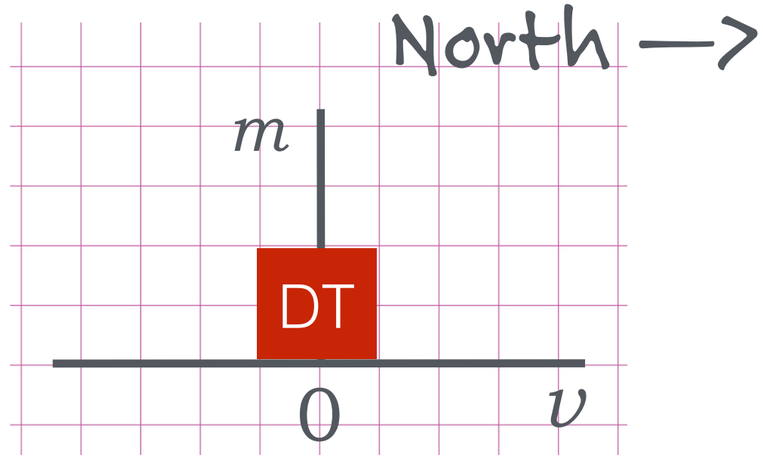
A



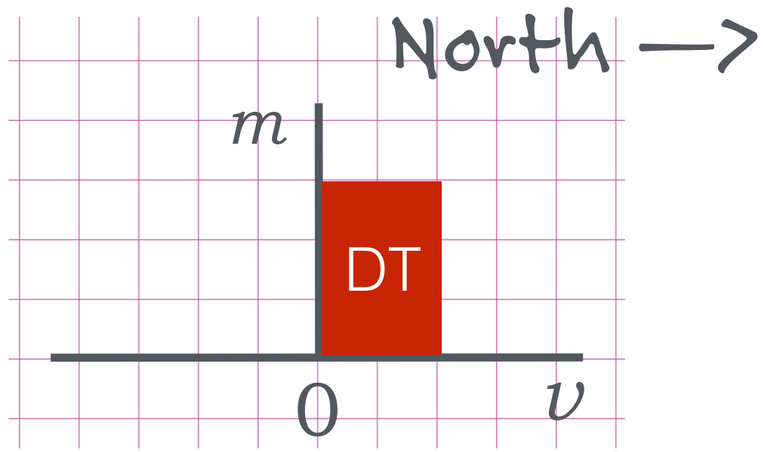
B



C



D



answer, defend

Same problem.

DT

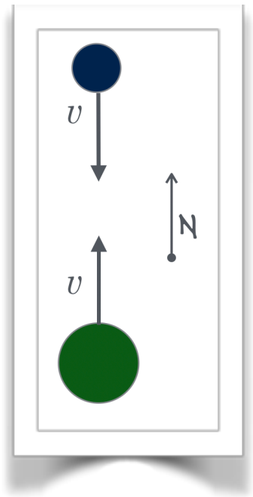
mass, DT: $m_D = 2$

v_0(DT) = 2 North

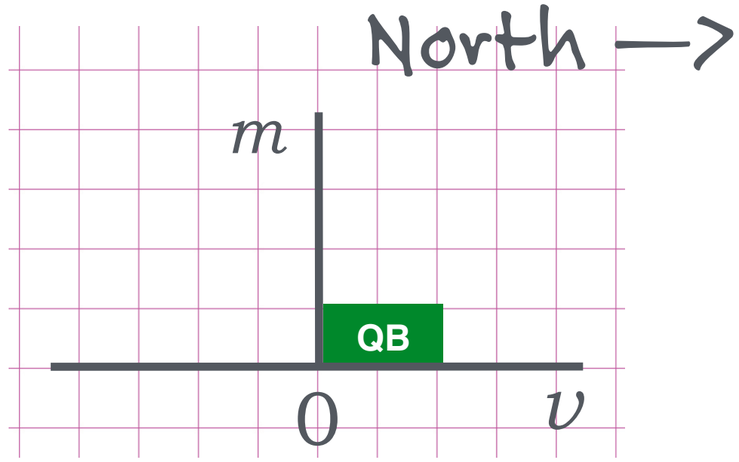
QB

mass, QB: $m_Q = 1$

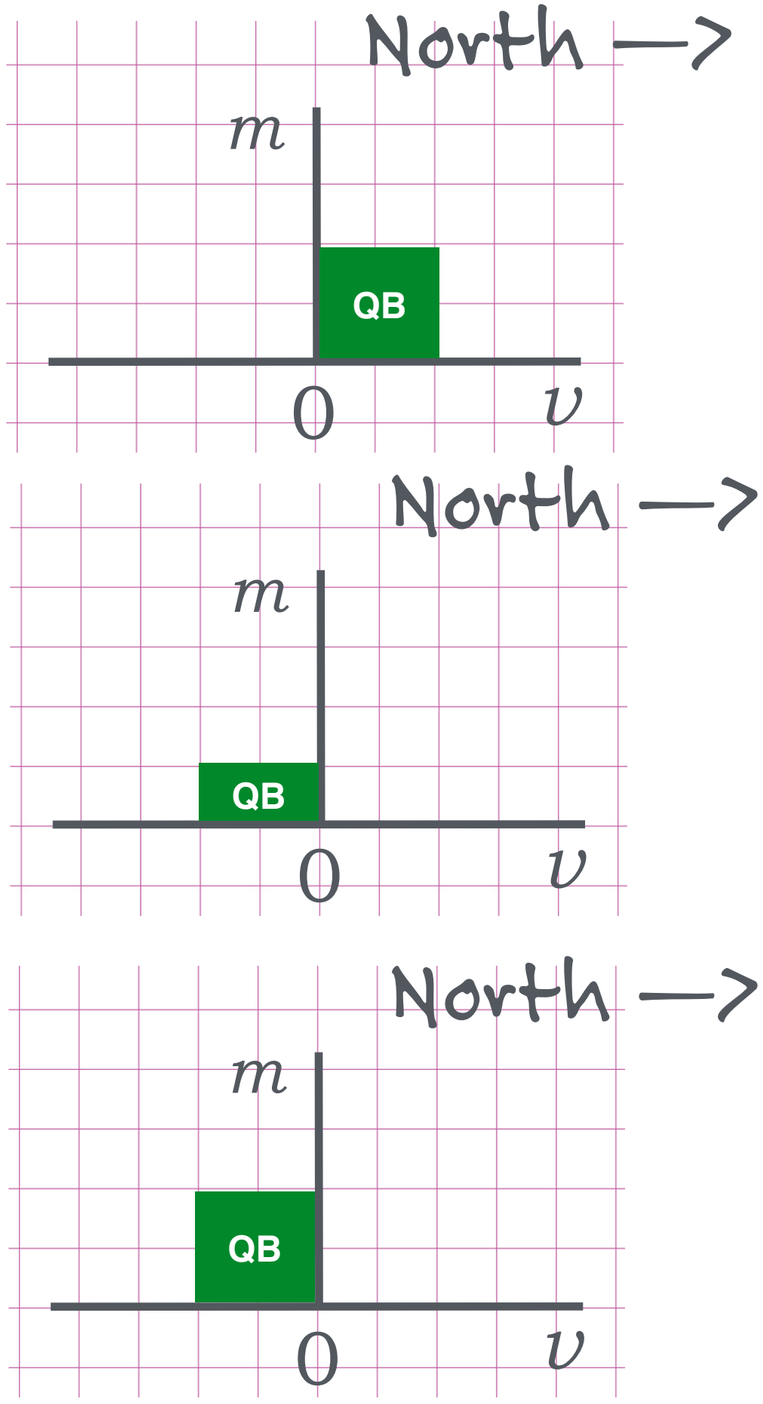
v_0(QB) = 2 South = -2 North



A



B



C

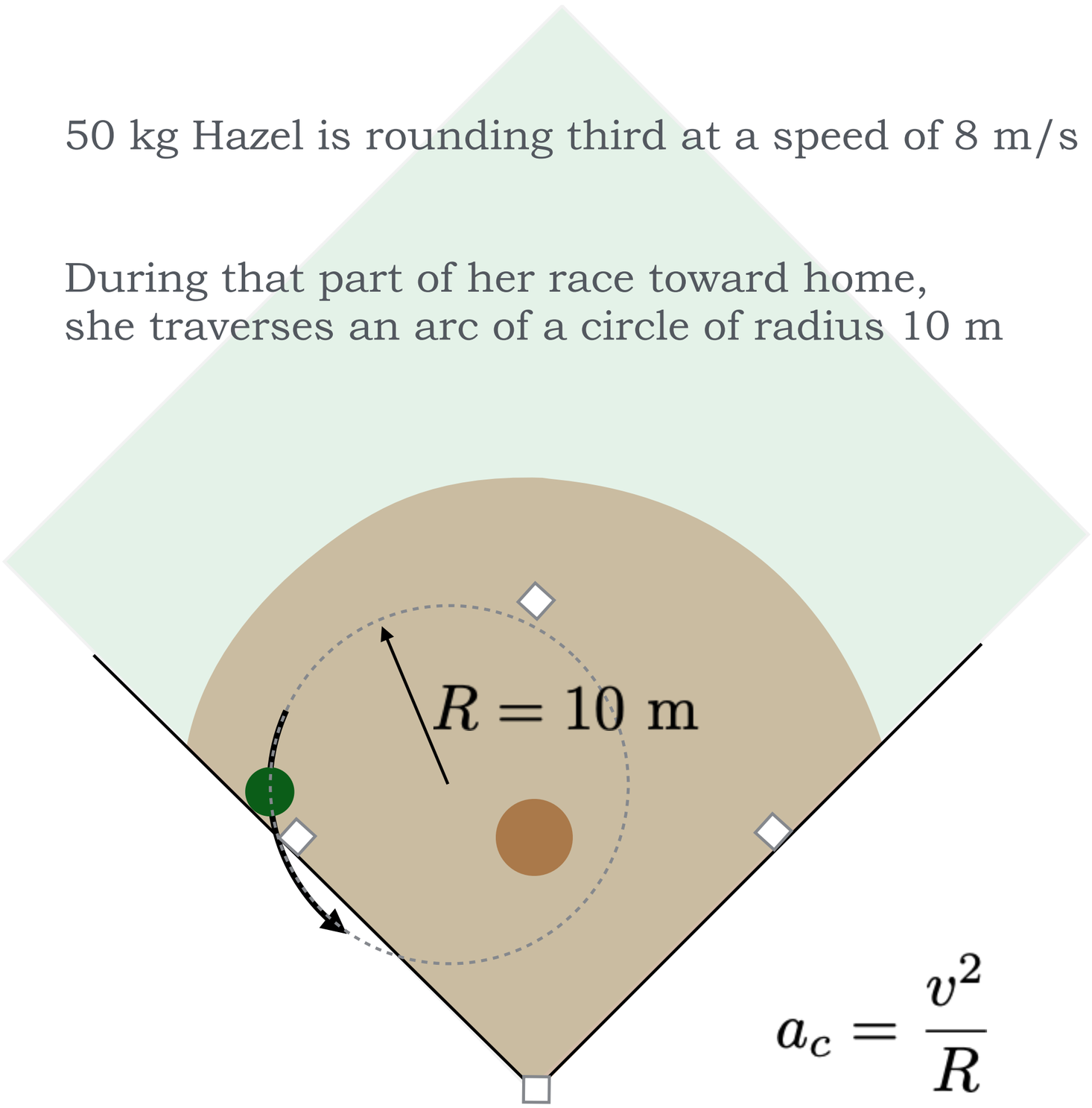
D

The initial QB momentum is best represented by:

answer, defend

50 kg Hazel is rounding third at a speed of 8 m/s

During that part of her race toward home, she traverses an arc of a circle of radius 10 m



$$a_c = \frac{v^2}{R}$$

What is her acceleration as she rounds third base?

A 9.8 m/s^2

B 0.8 m/s^2

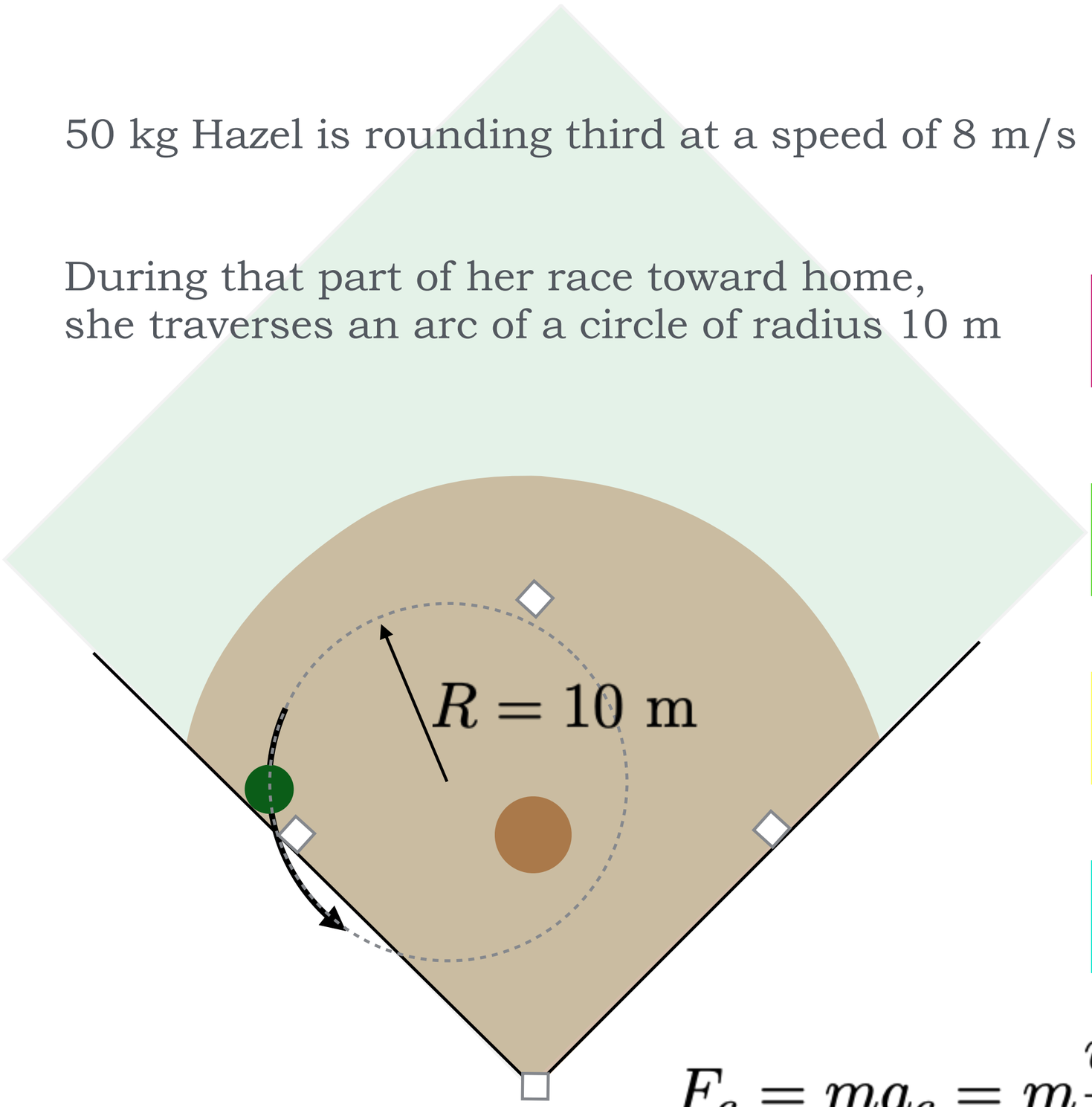
C 64 m/s^2

D 6.4 m/s^2

answer, defend

50 kg Hazel is rounding third at a speed of 8 m/s

During that part of her race toward home, she traverses an arc of a circle of radius 10 m



What force is required to keep her on that circular path?

A 320 N

B 32 N

C 64 N

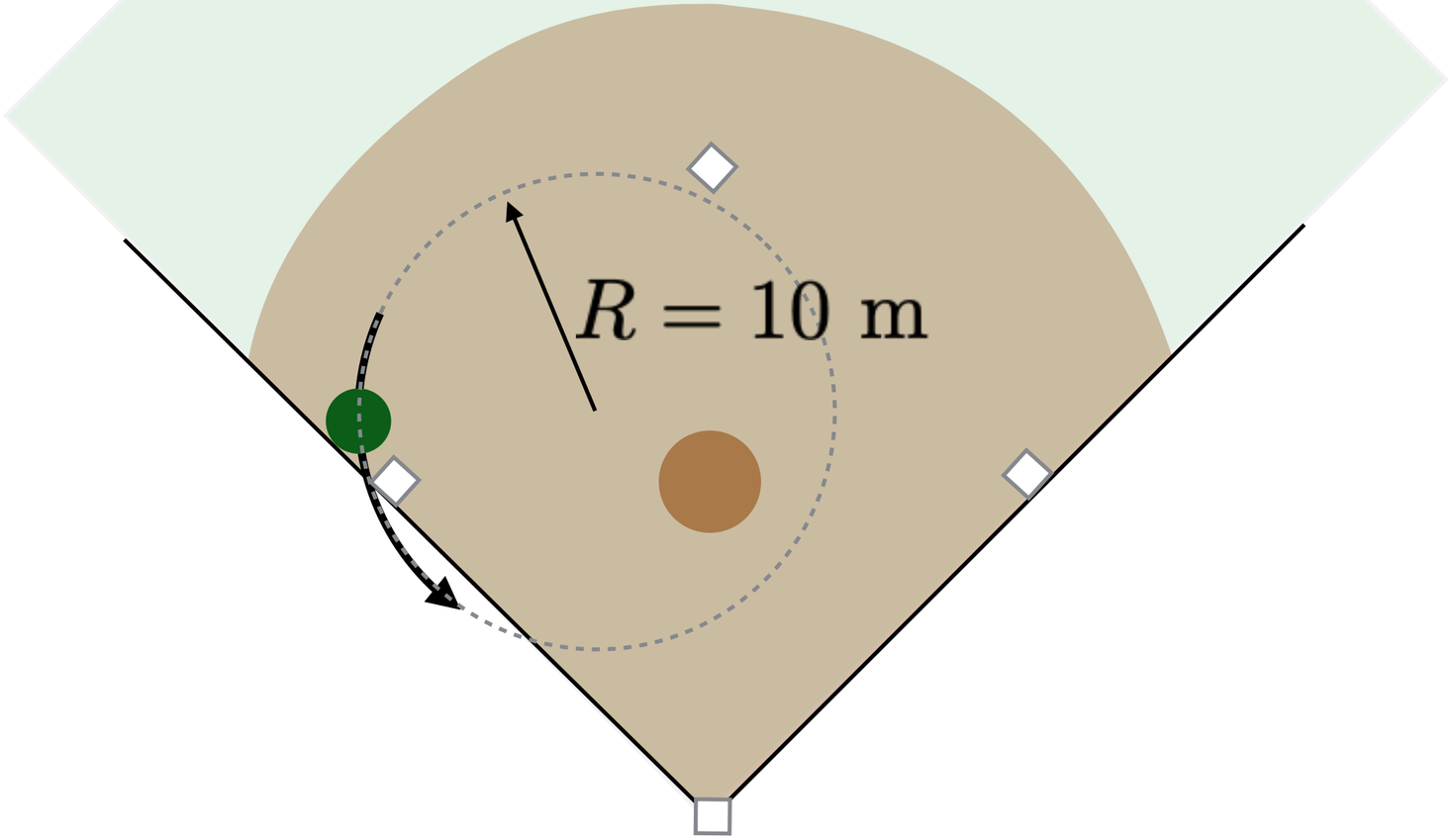
D 6.4 N

$$F_c = ma_c = m\frac{v^2}{R}$$

answer, defend

50 kg Hazel is rounding third at a speed of 8 m/s

During that part of her race toward home, she traverses an arc of a circle of radius 10 m



What supplies the force that keeps her on that circular path?

A an invisible rope

B gravity

C her cleats

D her coach

project

we’ll need to estimate a time

Darwinian Selection at work

On July 30, 2016 Luke Aikins jumped out of a perfectly good airplane at 25,000 ft

how long does it take for the net to stop him?

slow it down

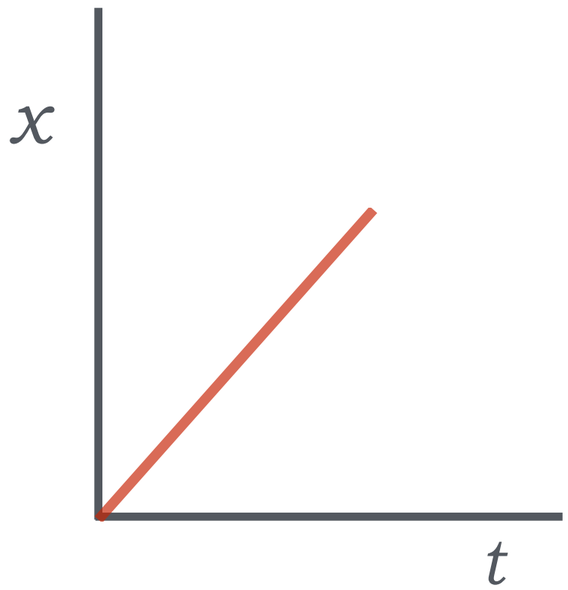
Hammer

Dilshod Nazarov of Tajikistan

Gold Medal, Rio

78.68 meters

World Record: 86.74 m, Yuriy Sedykh, Soviet Union



A

B

C

D