POD #21

Esker escapes from her yard and runs 200 m east. She then pivots and runs 400 m west. She makes a hard right turn and continues for 300 m until she stops to pee on the mailboxes. What is her displacement?

Don't forget to make a vector drawing as well as do the calculations!

24

POD #22

A car leaves the Los Angeles area and arrives at Las Vegas 5.0 hours later. If the displacement of the car from start to finish is 400 km northeast, which statement must be true?
a. The car traveled a distance of 400 km.
b. The car had an average speed of 80 km/hr.
c. The car had an average velocity of 80 km/hr, northeast.
d. The car had the same velocity during the 5 hour period.
e. The car had the same speed during the 5 hour period.

25

Problem 2 (30 points)
A 5 kilogram ball is shot directly right at 20 meters per second from a height of 10 meters. The ball loses 1 joule whenever it touches Earth. Assume no air resistance. When does the ball stop bouncing?

If there is no air, the surface of the Earth will be littered with the bodies of the dead. So, the ball will come to a halt in the first still-warm husk of a snuffed-out life it encounters.

Thus, the equation is simply

$y = y_0 + v_0 t + \frac{1}{2}at^2$

$0 = 10 + 0 + \frac{1}{2}(9.8)t^2$

$t = 1.4 s$

You monster.

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POD #23

A rocket accelerates upwards with an average velocity of 100 m/s for a time period of 10.0 seconds has passed. What is the displacement of the rocket during this time?
a. 2000 m
b. 2000 m, upwards
c. 1000 m
d. 1000 m, upwards
e. The problem can't be solved without more information

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1

POD #24

Acceleration is defined as...
a. how quickly a moving object's speed changes.
b. how quickly a moving object's velocity changes.
c. the change in an object's position over time.
d. the change in an object's displacement over time.
e. a scalar quantity.

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POD #25

A car begins accelerating from rest, and reaches a final velocity of 30.0 m/s in the positive x-direction 5.0 seconds later. The average velocity of the car was
a. +30 m/s
b. -30 m/s
c. +6.0 m/s
d. -6.0 m/s
e. +15 m/s

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POD #26

An object is dropped from the top of a high cliff, and it free-falls with negligible air friction. The average velocity of the object during its fall was 32 m/s downwards. What was the final velocity of the object just before it hits the ground?
a. 0 m/s
b. 32 m/s
c. 9.8 m/s
d. 64 m/s
e. 9.8 m/s^2

30

POD #27

A marble rolling across a carpet in the $-x$ direction (to the left), slows from an initial speed of 55 cm/s to a final speed of 11 cm/s, 4.0 seconds later? What is the acceleration of the marble during this time period?
a. 11 cm/s to the left
b. 11 cm/s to the right
c. 11 cm/s^2 to the left
d. 11 cm/s^2 to the right
e. none of these

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POD #28

An astronaut standing on the moon holds a large, heavy brick and a small, light rock, and then releases them from the same height at the same time. Which object reaches the moon's surface first?

a. The brick, because it's heavier and accelerates faster..
b. The brick, because it has a greater force of gravity acting on it.
c. The rock, because there is less air friction acting on it.
d. They reach the surface at the same time because their accelerations are equal.
e. Both the rock and brick will just float there when released—there is no gravity on the moon.

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POD #29

A rock is thrown into the air vertically by a student standing at the edge of the top of a tall building. If the rock has an initial velocity of 20 m/s, where is the ball located after 5.0 seconds have passed?

a. 10 meters above the top of the building
b. 25 meters above the top of the building
c. 5 meters below the top of the building
d. 25 meters below the top of the building
e. 225 meters below the top of the building

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POD #30

A 65 kg student is walking their dog.

a. How much do they weigh?

b. If a UFO abducts them and deposits them on the surface of Mars. They notice that their weight is 221 N, what is the acceleration due to gravity on Mars?

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