

Acceleration: Formative Review

Grade: 11
Subject: Physics 112
Date: 2014

Use the following situation to answer the assessment questions:

A ball is rolling on the ground at 11 m/s [W]. The wind then causes an acceleration of 6.4 m/s² [E] that lasts for 2.75 seconds.



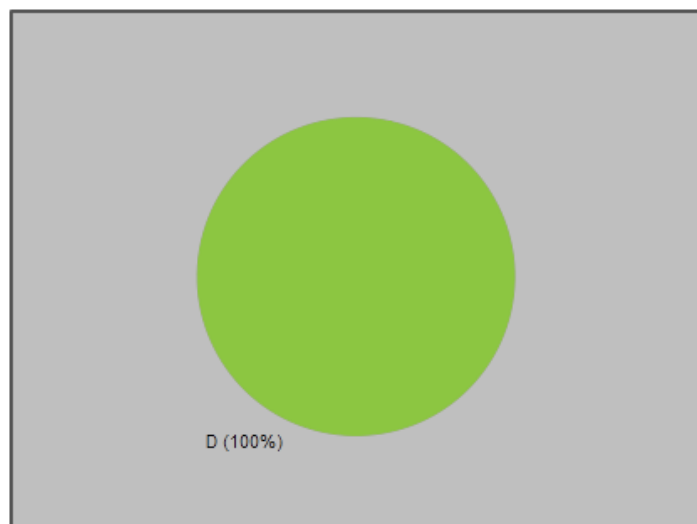
1 Relative to east, what is the value of the initial velocity?

A 6.4 m/s

B -6.4 m/s

C 11 m/s

D -11 m/s



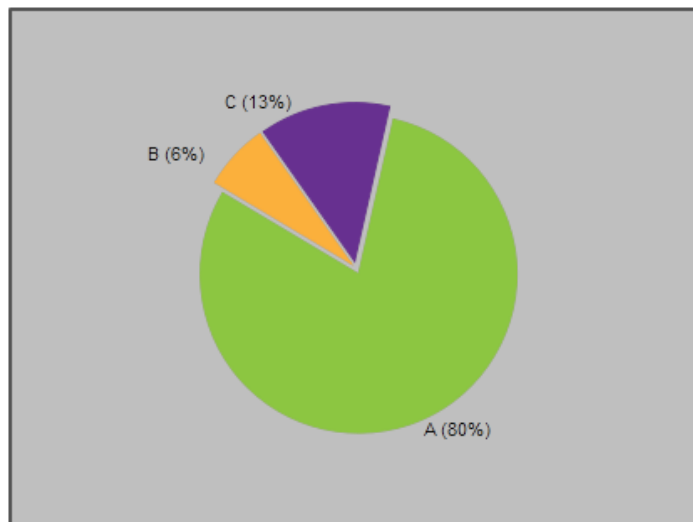
2 Relative to east, what is the change in velocity each second?

A 6.4 m/s²

B -6.4 m/s²

C 11 m/s²

D -11 m/s²



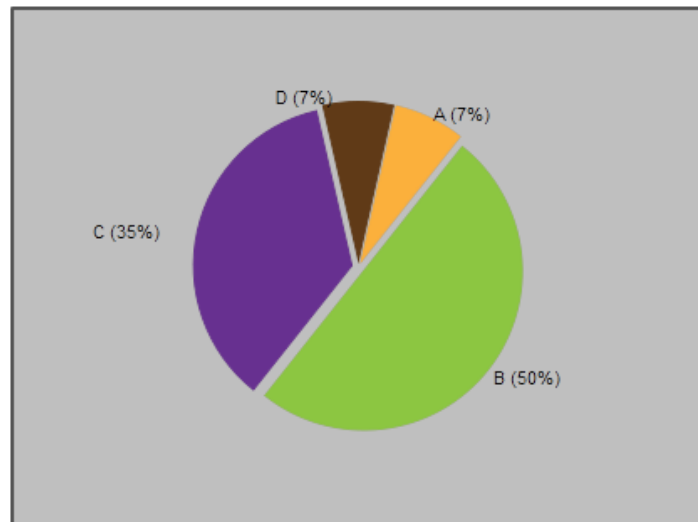
3 Calculate the final velocity of the soccer ball.

A -6.6 m/s [E]

B 6.6 m/s [E]

C 28.6 m/s [E]

D -28.6 m/ [E]



$$a = \frac{v_f - v_o}{t}$$

$$6.4 \times 2.75 = \frac{v_f - (-11)}{2.75} \times 2.75$$

$$17.6 = v_f + 11$$

$$6.6 \text{ m/s} = v_f$$

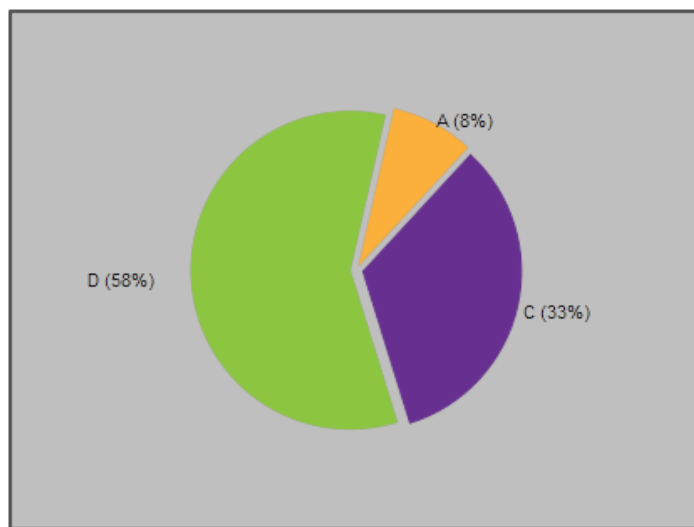
4 Calculate the displacement of the ball in that time.

A 54.5 m [E]

B -54.5 m [E]

C 6.1 m [E]

D -6.1 m [E]



$$d_f = d_o + v_o t + \frac{1}{2} a t^2$$

$$= 0 + (-11)(2.75) + \frac{1}{2}(6.4)(2.75)^2$$

$$= -6.1 \text{ m}$$

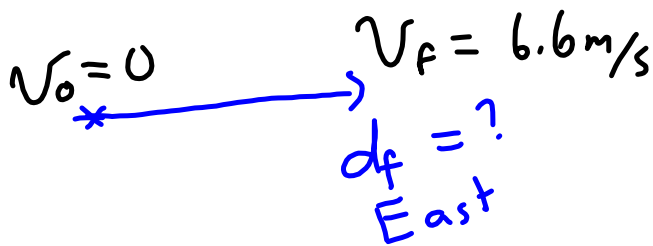
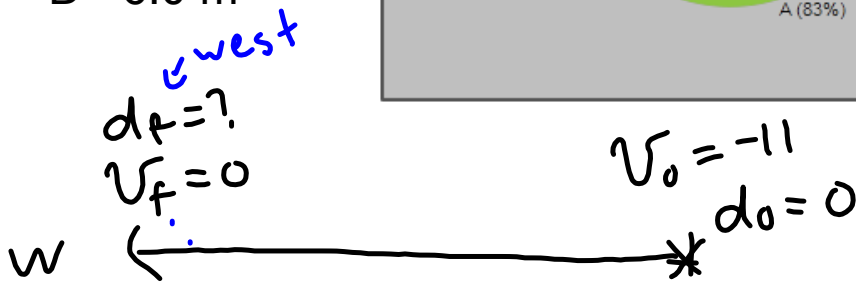
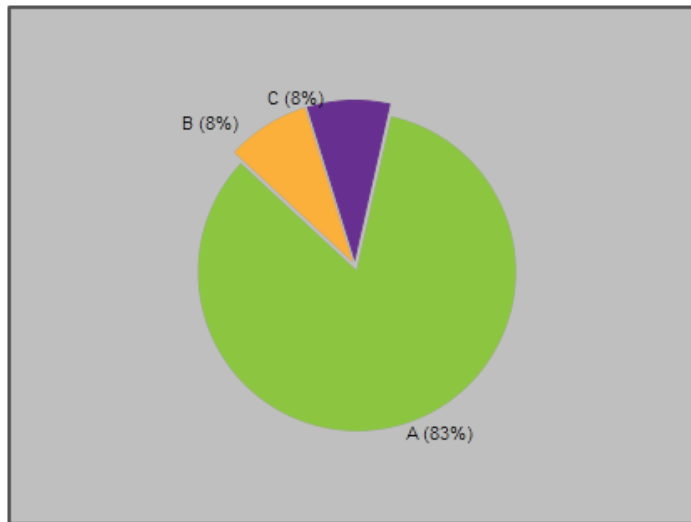
5 Calculate the total distance the ball traveled in that time.

A 12.8 m

~~B -12.8 m~~

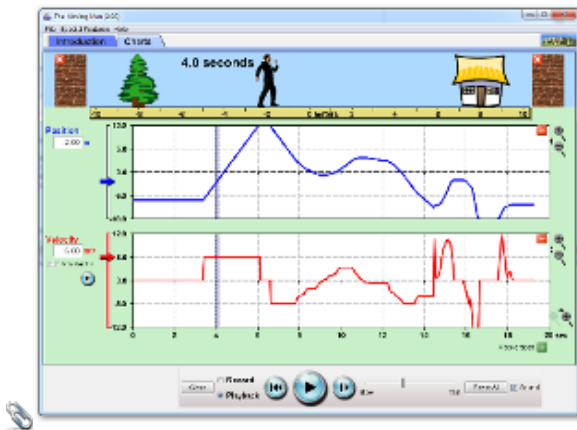
C 6.0 m

~~D -6.0 m~~



Velocity - Time Graphs

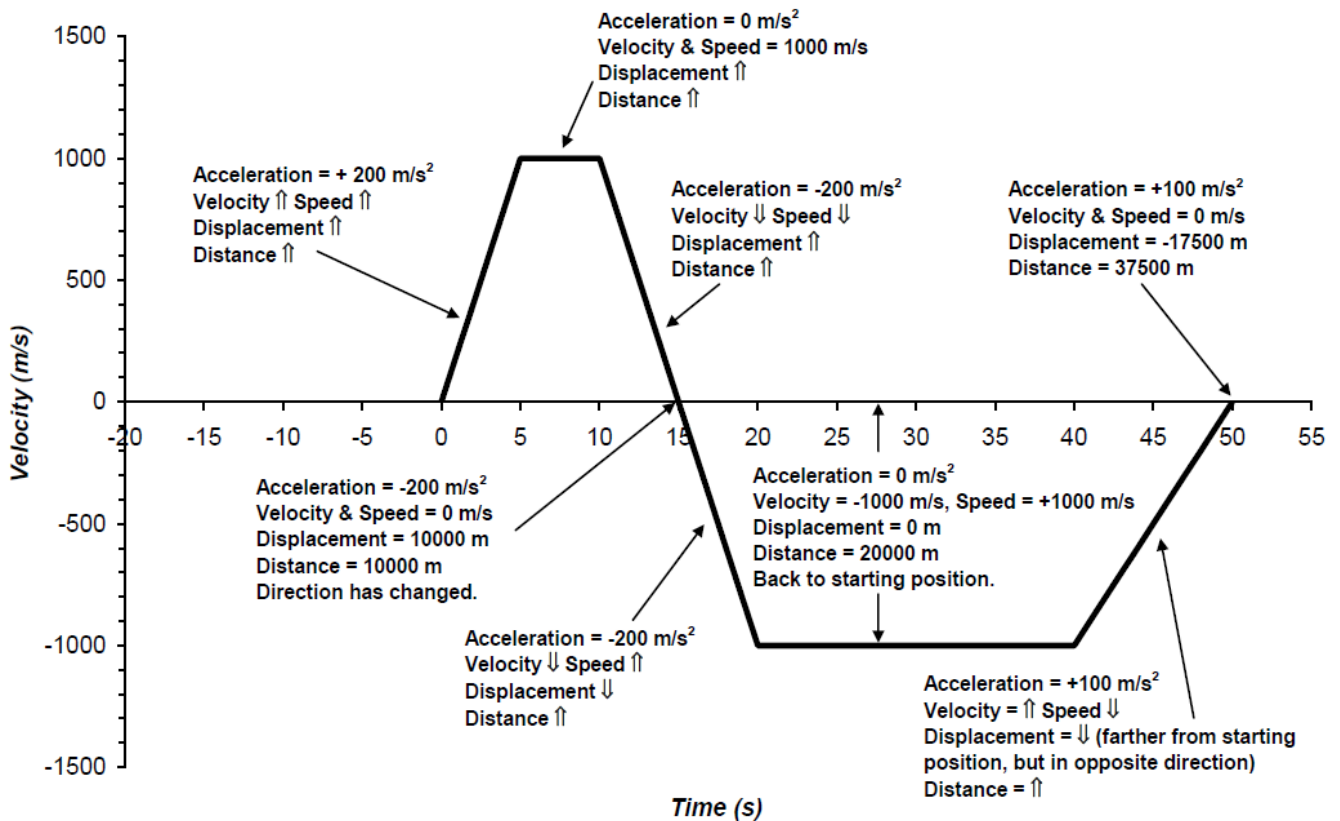
The Moving Man



Objectives

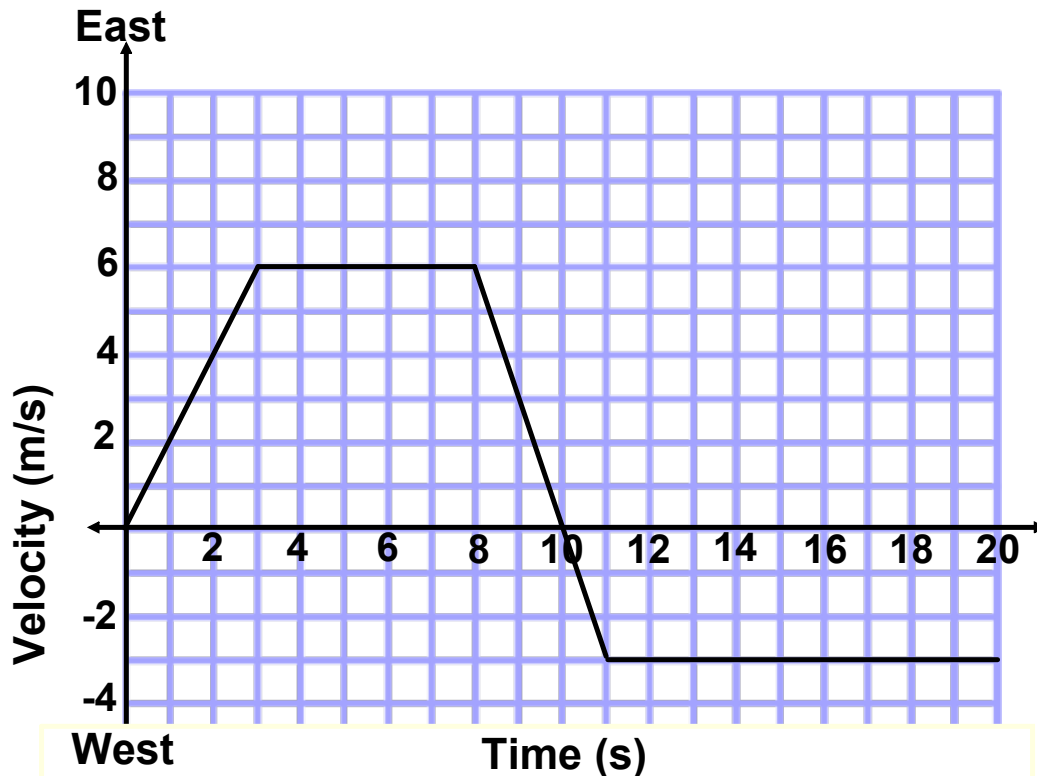
- Review Frame of reference and coordinate system.
- Analyze how velocity can change with time.
- Learn how to find key points on the graph.
- Discover the link between velocity-time distance/displacement calculations.

V-T Graph Analysis



- Slope at any point is the instantaneous acceleration.
- Sign of the slope indicates the direction of the acceleration *not* the object.
- Distance travelled during a time interval is the sum of the areas contained between the graph and the time-axis.
- Displacement is the total area of the top minus the total area of the bottom.
- *Average velocity* is the object's *displacement* divided by the time.
- *Average speed* is the object's *distance* divided by the time.

Velocity - Time Analysis Questions: Guided Practice



Qualitative Analysis (no calculations)

1. In what direction was the initial acceleration? *East*
2. Describe the direction of the velocity and acceleration between 8 and 11 seconds.
3. For how many seconds was the object not accelerating?
4. At what time(s) did the object change directions?
5. Did the object spend more time traveling east or west?
6. In which direction did the object cover the most distance?
7. Was the final displacement of the object east or west of the starting point? *East*

Attachments

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