Calculating Acceleration

Guided Practice (direction changes)

A baseball is thrown 15 m/s [E] and 5.6 s later it is moving 21 m/s [W]. Calculate the average acceleration of the baseball.

Reread question and set up the coordinate system

W,- E,+

Reread question and list known/wanted quantities - make quantities relative to positive direction

$\vec{v}_o = 15\ m/s\ [E]$ $\vec{v}_f = 21\ m/s\ [W] = -21\ m/s\ [E]$ $\vec{a} = ?$

$t = 5.6s$

Check for a formula using only the known and wanted quantities

$$\vec{a} = \frac{\vec{v}_f - \vec{v}_o}{t}$$

Substitute values and solve for the unknown

$$\vec{a} = \frac{-21 - 15}{5.6} = \frac{-36}{5.6} = \boxed{-6.4\ m/s^2}$$

Check answer conceptually - does its value and direction make sense?

Calculating Acceleration

Guided Practice (direction changes)

A dime is thrown upwards with a velocity of 35 m/s. Calculate the velocity of the dime 5.0 s later (no air resitsance).

Reread question and set up the coordinate system

Reread question and list known/wanted quantities - make quantities relative to positive direction huh?! What is acceleration?! This is stupid, I'm outta here.

$\vec{v}_o = 35\ m/s\ [up]$ $\vec{v}_f = ?$

$\vec{a} = -9.81\ m/s^2\ [up]$ ← acc of gravity on Earth. (g)

$t = 5.0\ s$

Check for a formula using only the known and wanted quantities

$$\vec{a} = \frac{\vec{v}_f - \vec{v}_o}{t}$$

Substitute values and solve for the unknown

$-9.81 = \dfrac{v_f - 35}{5.0}$ ×5 ×5

$-49.05 = v_f - 35$ +35 +35

$-14 = v_f$

$\boxed{-14\ m/s = v_f}$

Check answer conceptually - does its value and direction make sense?

Attachments

moving-man_all.jar