Warm-Up

A student is moving 1.8m/s near the top of a hill. 4.2 sec later she is travelling at 8.3m/s. What is her average acceleration?

$S_2 = S_1 + at$

$a = \frac{S_2 - S_1}{t}$

S_1 = 1.8m/s
S_2 = 8.3m/s
t = 4.2s

a=?

$$a = \frac{v_2 - v_1}{t} = \frac{8.3m/s - 1.8m/s}{4.2s} = \frac{6.5m/s}{4.2s} = 1.5m/s^2$$

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A car accelerates from rest (0 m/s) to 50.0 km/h in 8.20s.
a) What is the average acceleration of the car in m/s^2?
b) What time would the car take to accelerate from 40. km/h to 60. km/hr?

a) $s_1 = 0$ km/hr
$s_2 = 50.0$ km/hr $= 13.9$ m/s
$t = 8.20$ s

$a = \frac{s}{t}$

$= \frac{13.9 \text{ m/s}}{8.20 \text{ s}} =$

$= 1.70 \text{ m/s}^2$

b) $a = 1.70 \text{ m/s}^2$
$s_1 = 40.$ km/hr $= 11$ m/s
$s_2 = 60.$ km/hr $= 17$ m/s
$t = ?$

$s_2 = s_1 + at$

$s_2 - s_1 = at$

$\frac{s_2 - s_1}{a} = t$

$t = \frac{s_2 - s_1}{a}$

$= \frac{17 - 11}{1.70} = 3.5$ seconds

$$t \times a = \frac{s_1 - s_2}{t} \times t$$

$$\frac{at}{a} = \frac{s_1 - s_2}{a}$$

You are coasting on your skateboard, and you decide to speed up. If you accelerate at 0.50m/s^2 for 7.0s and your final speed is 3.4 m/s, what was your initial speed?

$a = 0.50\,m/s^2$

$t = 7.0\,s$

$v_2 = 3.4\,m/s$

$v_1 = ?$

$v_2 = v_1 + at$

$-at \quad\quad -at$

$v_2 - at = v_1$

$v_1 = (3.4\,m/s) - (0.50\,m/s^2)(7.0\,s)$

$= 3.4\,m/s - 3.5\,m/s$

$= -0.1\,m/s$ ← backwards

Lindsay's acceleration is 2.5m/s^2 for 1.5s. What is her change in speed?

$s = ?$

$a = 2.5\,m/s^2$

$t = 1.5\,s$

$\therefore$

$t \times a = \frac{s}{t} \times t$

$at = s$

$(2.5\,m/s^2)(1.5\,s) = s$

$3.8\,m/s = s$

$$\frac{3.5\,m}{s^2} \times \frac{2\,s}{1} = \frac{7.0\,m/\cancel{s}}{s\cancel{s}}$$

Vince rollerblades down a hill and changes his speed from rest to 1.9m/s. If the acceleration was 0.40m/s^2, for how long was Vince on the hill?

$s = 1.9\,m/s$

$a = 0.40\,m/s^2$

$t = ?$

$a = \frac{s}{t}$

$at = s$

$t = \frac{s}{a}$

$= \frac{1.9\,m/s}{0.40\,m/s^2}$

$= 4.8\,s$

A bus with an initial speed of 12.0 m/s accelerated at 0.62 m/s^2 for 15.0s. What is the final speed of the bus?

$v_2 = ?$

$v_1 = 12.0\ m/s$

$a = 0.62\ m/s^2$

$t = 15.0\ s$

$v_2 = v_1 + at$

$= (12.0\ m/s) + (0.62\ m/s^2)(15.0\ s)$

$= 12.0\ m/s + 9.3\ m/s$

$= 21\ m/s$

$$\frac{0.62\,m}{s^2} \times 15.0\,s = \frac{9.3\,m/\cancel{s}}{5.\cancel{8}}$$

$$= 9.3\,m/s$$

Complete Questions pg 389 #11-14

I actually assigned these questions yesterday. This is your second chance :)

answers pg 388 #1-5,7-9.notebook