Practice Problem

"hidden variable"

A person on roller skates start from rest and accelerates to reach 3.6 m/s over 3 seconds. What is their acceleration?

$V_i = 0 m/s$

$t = 3 sec$

$V_f = 3.6 m/s$

$a = ?$

$V_f = \cancel{V_i}^{0} + at$

$\frac{3.6}{3} = \frac{a(3)}{3}$

$a = 1.2 m/s^2$

Practice Problem

A car is traveling at 20 m/s and sees a red light so they slow down at a rate of -3 m/s/s. How much distance did they cover?

$a = -3\ m/s/s$

$V_i = 20\ m/s$

$V_f = 0\ m/s$

$d = ?$

$$V_f^2 = V_i^2 + 2ad$$

$$0^2 = 20^2 + 2(-3)d$$

$$0 = 400 - 6d$$

$$-400 \quad -400$$

$$\frac{-400}{-6} = \frac{-6d}{-6}$$

$$d = 67\ m$$

Partner Practice

1. A dog sees a squirrel and runs towards it over a distance of 30 m in 10 seconds. What is acceleration of the dog?
2. An object is pushed with an initial velocity of 3 m/s and rolls across a table to a stop over 1.2 m. What is the acceleration of the object? How long does it take to stop?
3. If a person starts from rest and runs 100 m in 20 seconds, what is their acceleration? Final Velocity?

① $V_i = 0\ m/s$

$d = 30m$

$t = 10s$

$a = ?$

$d = \cancel{V_i t} + \frac{1}{2}at^2$

$30 = \frac{1}{2}a(10)^2$

$30 = \frac{1}{2}(100)a$

$\frac{30}{50} = \frac{50a}{50}$

$0.6\ m/s^2 = a$

② $V_i = 3\ m/s$

$V_f = 0\ m/s$

$d = 1.2m$

$a = ?$

$t = ?$

$V_f^2 = V_i^2 + 2ad$

$0^2 = 3^2 + 2a(1.2)$

$0 = 9 + 2.4a$

$-9 \quad -9$

$\frac{-9}{2.4} = \frac{2.4a}{2.4}$

$a = -3.75\ m/s^2$

$V_f = V_i + at$

$0 = 3 + (-3.75)t$

$-3 \quad -3$

$-3 = -3.75t$

$t = 0.8sec$

③ $V_i = 0\ m/s$

$d = 100\ m$

$t = 20\ s$

$a = ?$

$V_f = ?$

$$d = \cancel{V_i t}^{0} + \frac{1}{2}at^2$$

$$100 = \frac{1}{2}a(20)^2$$

$$100 = \frac{1}{2}(400)a$$

$$\frac{100}{200} = \frac{200a}{200}$$

$$a = 1/2\ m/s^2$$

$$V_f = \cancel{V_i}^{0} + at$$

$$V_f = 1/2(20)$$

$$V_f = 10\ m/s$$