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22) $m = 1.4\ kg$

$a = 1.25\ m/s^2$

$\mu_k = ?$

$m\,a = \frac{F_{net}\,(m)}{m}$

$F_{net} = m\,a$

$= (1.4\ kg)(1.25\ m/s^2)$

$F_{net} = 1.75\ N = F_{f_K}$

$\frac{F_{f_K}}{F_N} = \frac{\mu_K F_N}{F_N} \Rightarrow \mu_K = \frac{F_{f_K}}{F_N}$

EQUALS F_g

$F_g = m\,g$

$= (1.4\ kg)(9.81\ m/s^2)$

$= 13.734\ N$

$= \frac{1.75\ N}{13.734\ N}$

$= .127$

23) $m_{BOOKCASE} = 41\ kg$

$PUSH = 65\ N$

$a = .12\ m/s^2$

$\mu_k = ?$

$F_{net} = F_{PUSH} - F_f$

$4.92\ N = 65\ N - F_f$

$-65\ N \quad -65\ N$

$-60.08\ N = -F_f$

FINALLY

$F_f = \mu F_N$

$\mu = \frac{F_f}{F_N}$

$= \frac{60.08\ N}{402.21\ N}$

$= .149$

$a = \frac{F_{net}}{m}$

$F_N = F_g = m\,g$

$= (41\ kg)(9.81\ m/s^2)$

$= 402.21\ N$

$F_{net} = m\,a$

$= (41\ kg)(.12\ m/s^2)$

$= 4.92\ N$

24) $V_f = 0 \text{ m/s}$

$V_i = 5.8 \text{ m/s}$

$\mu = 0.31$

$d = ?$

Solve For a

$$a = \frac{F_{net}}{m}$$

what is the net Force? IT IS EQUAL TO THE F_f

$$F_f = \mu F_N$$

$$a = \frac{\mu F_N}{m}$$

WHAT IS F_N? IT IS EQUAL TO THE WEIGHT OR F_g

$$a = \frac{\mu F_g}{m}$$

$$F_g = w = mg$$

$$a = \frac{\mu \cancel{m} g}{\cancel{m}}$$

Mass CANCELS

$$a = \mu g$$

$$= (.31)(9.81 \text{ m/s}^2)$$

$$a = 3.0411 \text{ m/s}^2$$

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

$$0^2 = (5.8 \text{ m/s})^2 + 2(3.04 \text{ m/s}^2)d$$

$$0 = 33.64 \frac{m^2}{s^2} + (6.12 \text{ m/s}^2)(d)$$

$$-33.64 \frac{m^2}{s^2} = (6.12 \text{ m/s}^2)d$$

$$\frac{-33.64 \frac{m^2}{s^2}}{6.12 \text{ m/s}^2} = \frac{(6.12 \text{ m/s}^2)d}{6.12 \text{ m/s}^2}$$

$$5.5 \text{ m} = d$$

25.) $V_f = 2\ m/s$

$V_i = 1\ m/s$

$a = 2\ m/s^2$

$V_f = V_i + at$

$2\ m/s = 1\ m/s + (2\ m/s^2)(t)$

$-1\ m/s \quad -1\ m/s$

$\frac{1\ m/s}{2\ m/s^2} = \frac{(2\ m/s^2)(t)}{2\ m/s^2}$

$.5\ s = t$

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26) $V_i = 23\ m/s$

$\mu = .41$

$V_f = 0\ m/s$

$d = ?$

SEE #24

$a = \mu g$

$= (.41)(9.81\ m/s^2)$

$= 4.0221\ m/s^2$

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

$0\ m/s = (23\ m/s)^2 + 2(-4.0221\ m/s^2)(d)$

$0 = 529\ m^2/s^2 + (-8.0442\ m/s^2)(d)$

$\frac{-529\ m^2/s^2}{-8.0442\ m/s^2} = \frac{(-8.0442\ m/s^2)(d)}{-8.0442\ m/s^2}$

$65.76\ m = d$

CAR HITS TREE BRANCH BECAUSE IT TAKES ALMOST 66m TO STOP AND BRANCH IS ONLY 60m AWAY