May 18, 2018

1) answers WS #1-8

2) more practice

Test Thurs May 31

Dec 1-2:16 PM

Newton's Laws WS

1. $m = 1750\,kg$
   $a = 1.35\,m/s^2$

$\vec{F}_{net} = m\vec{a}$
$\vec{F}_{net} = (1750)(1.35)$
$\vec{F}_{net} = 2363\,N$

2. $a = 4.00\,m/s^2$
   $F_{net} = 3000\,N$
   $m = ?$

$\vec{F}_{net} = m\vec{a}$
$\frac{3000\,N}{4.00\,m/s^2} = \frac{m(4.00\,m/s^2)}{4.00\,m/s^2}$
$750\,kg = m$

3. $m = 5.2\,kg$
   $v_0 = 0\,m/s$
   $v_f = 12\,m/s$
   $d = 5.0\,m$
   $F = ?$
   $d_0 = 0\,m$

$v_f^2 = v_0^2 + 2a(d_f - d_0)$
$(12)^2 = (0)^2 + 2a(5-0)$
$144 = 0 + 2a(5)$
$\frac{144}{10} = \frac{10a}{10}$
$14.4\,m/s^2 = a$

$F_{net} = ma$
$F_{net} = (5.2)(14.4)$
$F_{net} = 75\,N$

4. $v_0 = 4.0\ m/s$
$v_f = 0\ m/s$
$d_f = 0.40\ m$
$F_{avg} = 1200\ N$
$m = ?$

$v_f^2 = v_0^2 + 2a(d_f - d_0)$
$(0)^2 = (4)^2 + 2a(0.40)$
$0 = 16 + 0.8a - 16$
$\frac{-16}{0.8} = \frac{0.8a}{0.8}$
$20\ m/s^2 = a$

$F_{net} = ma$
$\frac{1200}{20} = \frac{m(20)}{20}$
$60\ kg = m$

5. $m_c = 20\ kg$
$m_{SB} = 3\ kg$
$a = 0.50\ m/s^2$
$a_{SB} = ?$

$|F_{net\ child}| = |F_{net\ SB}|$

$m_{cac} = m_{SB} a_{SB}$
$(20)(0.5) = (3)(a_{SB})$
$\frac{10}{3} = \frac{3a_{SB}}{3}$
$3.33\ m/s^2 = a_{SB}$

6. Planet X
$m = 50\ kg$
$F = 180\ N$
$a = ?$

a) $F_{net} = ma$
$\frac{180\ N}{50} = \frac{(50)a}{50}$
$3.6\ m/s^2 = a$

b) Force to lift on Earth
$F_g = mg$
$F_g = (50)(9.81)$
$F_g = 491\ N$

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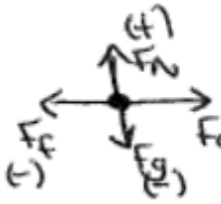
7. $F_a = 20N$
$m = 9.0kg$
$a = 2.0 m/s^2$

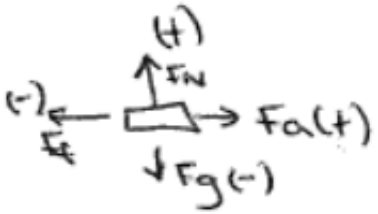


a) $F_{net} = ma$
$F_{net} = (9.0)(2.0)$
$F_{net} = 18N$

$F_{net} = F_a + F_f$
$18N = 20N + F_f$ -20
$2N = F_f$

b) $\mu = ?$ $F_f = \mu F_N$
$F_g = mg$ $\frac{2}{88} = \frac{\mu 88}{88}$
$F_g = (9)(9.81)$ $0.023 = \mu$
$F_g = 88N$

8. $m = 2.0kg$
$\mu = 0.38$
constant velocity
$F_a = ?$



$|F_g| = |F_N|$
$F_g = mg$
$F_g = (2)(9.81)$
$F_g = 19.62 N$

$|F_a| = |F_f|$

$F_f = \mu F_N$
$F_f = (0.38)(19.62)$
$F_f = 7.5 N$

Combining Dynamics and Kinematics

Undergoing an acceleration a 750 kg car's velocity goes from 21 m/s [E] to 15 m/s [W] in 7.5 s.

1. Calculate the average (net) force acting on the car. (-3600 N)
2. Calculate the final position of the car assuming the initial position is zero. (22.5 m)

$m = 750\,kg$ $\quad F_{net} = ma$

$v_0 = 21\,m/s\ [E]$

$v_f = 15\,m/s\ [W]\ (-15)$

$t = 7.5\,s$ $\quad a = \frac{v_f - v_0}{t}$

$a = \frac{-15 - 21}{7.5}$

$a = -4.8\,m/s^2$

$F_{net} = ma$

$= (750)(-4.8)$

$F_{net} = -3600\,N$

2. $a = -4.8\,m/s^2$

$F_{net} = -3600$

$v_0 = 21\,m/s$

$v_f = -15\,m/s$

$t = 7.5\,s$

$d_0 = 0$

$d_f = ?$

$d_f = d_0 + v_0 t + \frac{1}{2}at^2$

$d_f = 0 + (21)(7.5) + \frac{1}{2}(-4.8)(7.5)^2$

$d_f = 157.5 + \frac{1}{2}(-4.8)(56.25)$

$d_f = 157.5 + -135$

$d_f = 22.5\,m$

OR

$v_f^2 = v_0^2 + 2a(d_f - d_0)$

$(-15)^2 = (21)^2 + 2(-4.8)(d_f - 0)$

$225 = 441 + -9.6\,d_f$ $\quad -441$

$\frac{-216}{-9.6} = \frac{-9.6\,d_f}{-9.6}$

$22.5 = d_f$

Aug 8-11:35 AM

Newtons 2nd Law Practice WS #9-17

Apr 18-9:18 AM