Pg 130

Ch4 Extra Practice

1. inertial mass - an object's resistance to being accelerated by a force $F=ma$
   gravitational mass - the mass as measured in a gravitati[onal] field $F=mg$

2. when heavier, tanker is more difficult to get moving, stop and turn a corner

3. When rear-ended the car suddenly moves forward, but the head tries to remain in same location so whips back as car jumps ahead. Headrest stops head from ending up too far back.
   (* same as pg108 #6)

4. see answer for #3 * remove this question

5. Once the puck is in motion on a basically frictionles[s] surface, it will keep going (inertia)

6. Pets should because they will keep moving forward if the car stops suddenly.

7. $F=ma$
   $[N]=[kg \cdot \frac{m}{s^2}]$

8. $F=ma$
   $=(55kg)(1.0\frac{m}{s^2}) = \underline{\underline{55N}}$

9. $m=\frac{270N}{9.8N/kg} = 27.55kg$ (assume no friction since skating)
   $F=ma$
   $=(27.55kg)(0.7m/s^2) = 19N \rightarrow \underline{\underline{2\times10^1N}}$

10. $F_{net} = F_{app} - F_{against}$

$ma = 24N - F_{Gareth}$

$F_{Gareth} = 24N - (1.25kg)(1.4 m/s^2) = \underline{\underline{22 N}}$

11. at rest: $F = (70kg)(9.8 \frac{N}{kg}) = \underline{\underline{6.9 \times 10^2 N}}$

accelerating: $F_{total} = F_{person} + F_{accel}$

$= (70)(9.8) + (70)(2.25 m/s^2)$

$= \underline{\underline{8.4 \times 10^2 N}}$

12. $\Delta p$ = impulse

$mv_f - mv_i = Ft$

$0.4kg(.5\frac{m}{s} - 0) = (0.6N)t$

$t = \underline{\underline{0.33 s}}$

13. The boards push back on Owen so he moves away from the boards.

14. $F_{net} = F_{app} - F_{against}$

$ma = 15N - 0$ — "no" friction on ice

$a = \frac{15N}{40kg} = \underline{\underline{0.38 m/s^2}}$

15. $F = ma$

$(2100kg)(-4.5 m/s^2) = F$

$F_{against} = -\underline{\underline{9.5 \times 10^3}} N$

16. $F = mg + ma$ $\qquad F_{net} = F_{app} - F_{against}$

$275N = m(9.8) + m(6 m/s^2)$ $\qquad m6 = 275 - m\,9.8$

$m = \underline{17 kg}$

17a) $V_i = 0$

$V_f = 100 \frac{km}{h} \div 3.6 = 27.\overline{7} \frac{m}{s}$

$t = 1.95s$ $\qquad a = \frac{V_f - V_i}{t}$

$a = ?$ $\qquad = \frac{27.\overline{7} - 0}{1.95s} = 14.245 m/s^2$

$\rightarrow \underline{14.2 m/s^2}$

b) $d = 350m$

$V_f = ?$

$V_i = 0$ $\qquad V_f = V_i + at$

$a = 184.6 m/s^2$ $\qquad = (14.245)(4.67)$

$t = 4.67s$ $\qquad = \underline{66.5 m/s}$

Force: $\Delta p$ = impulse $\qquad$ driver: $\frac{833N}{9.8 N/kg}$

$m(V_f - V_i) = F\Delta t$ $\qquad = 85 kg$

$774(66.524 - 0) = F(4.67)$

$F = \underline{1.1 \times 10^4 N}$ $\qquad$ car+driver = 774

18. $m = 0.13 kg$

$V_f = 0$

$V_i = 25 m/s$ $\qquad a = \frac{0 - 25 m/s}{0.05s}$

$t = 0.05s$

$a = ?$ $\qquad = \underline{-500 m/s^2}$

$m(V_f - V_i) = F\Delta t$

$0.13kg(0 - 25) = F(0.05)$

$F = \underline{-65N}$