18

Make sure you show all your work on the problems below

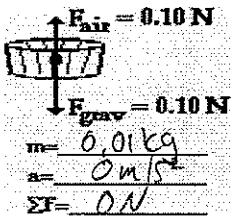
$-80{,}000 = 10{,}000 + F_{air}$

Free-body diagrams are shown for a variety of physical situations. Use Newton's second law of motion ($\Sigma F = m \cdot a$) to fill in all blanks. Use the approximation that $g = -10$ m/s/s.

$4800N = F_{air} - 8000N$

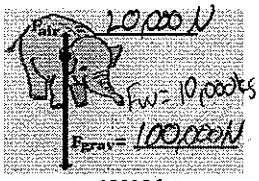
$m = \frac{F}{a} = \frac{0.10N}{10m/s^2}$

a.



m= 0.01 kg
a= 0 m/s²
ΣF= 0 N

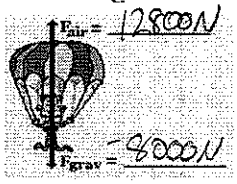
b.



$F_{gr} = 10{,}000kg \cdot 10m/s^2$

m=10000 kg
a = 8.0 m/s/s, down
ΣF = _____

c.

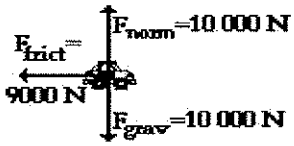


$F_{gr} = 80kg \cdot 10m/s^2 =$

m=800 kg
a = 6.0 m/s/s, up
ΣF = 4800N

$\Sigma F = 800kg \cdot 6m/s^2$

d.



$a = \frac{-9000N}{1000m}$

m= 1000 kg
a= -9 m/s²
ΣF= -9000 N

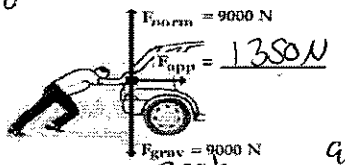
e. $F = 10{,}000kg \cdot 8m/s^2$

$-80{,}000$

m=0.500 kg
a = 248 m/s²
ΣF = 124 N, right

$a = \frac{124N}{5kg}$

f.

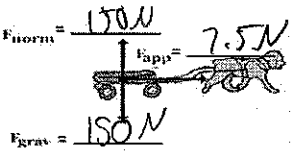


m= 900 kg
a = 1.50 m/s/s, right
ΣF = 1350 N

$\frac{9000N}{10m/s^2}$

$\Sigma F = 900kg \cdot 1.5m/s^2$

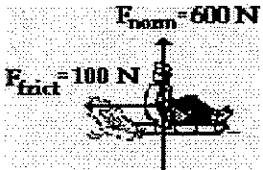
g.



$\Sigma F = 15kg \cdot 0.5m/s^2$

m=15.0 kg
a = 0.50 m/s/s, right
ΣF = 7.5 N

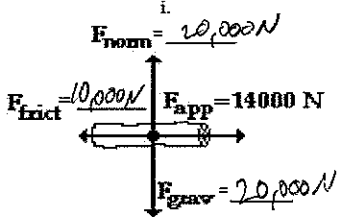
h.



m= 60 kg
a= -1.6 m/s²
ΣF= -100 N

$a = \frac{-100}{60kg}$

i.



m=2000 kg
a=2.0 m/s/s, right
ΣF= 4000 N

$\Sigma F = 2000kg \cdot 2m/s^2$

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

Use Newton's second law to predict the effect of an alteration in mass or net force upon the acceleration of an object.

a. An object is accelerating at a rate of 8 m/s² when it suddenly has the net force exerted upon increased by a factor of 2. The new acceleration will be 16 m/s².

b. An object is accelerating at a rate of 8 m/s² when it suddenly has the net force exerted upon increased by a factor of 4. The new acceleration will be 32 m/s².

c. An object is accelerating at a rate of 8 m/s² when it suddenly has the net force exerted upon decreased by a factor of 2. The new acceleration will be 4 m/s².

d. An object is accelerating at a rate of 8 m/s² when it suddenly has its mass increased by a factor of 2. The new acceleration will be 4 m/s².

e. An object is accelerating at a rate of 8 m/s² when it suddenly has its mass decreased by a factor of 4. The new acceleration will be 32 m/s².

$8 = \frac{2F}{\frac{1}{4}m}$

f. An object is accelerating at a rate of 8 m/s² when it suddenly has the net force exerted upon increased by a factor of 2 and its mass decreased by a factor of 4. The new acceleration will be 64 m/s².

$8 = \frac{4F}{2m}$

g. An object is accelerating at a rate of 8 m/s² when it suddenly has the net force exerted upon increased by a factor of 4 and its mass increased by a factor of 2. The new acceleration will be 16 m/s².

h. An object is accelerating at a rate of 8 m/s² when it suddenly has the net force exerted upon increased by a factor of 3 and its mass decreased by a factor of 4. The new acceleration will be 96 m/s².

$8 = \frac{3F}{\frac{1}{4}m}$