1. Vector sum of all forces acting on the object

2. doubled

3. halved

4. The acceleration of an object is directly proportional to the net force acting on it and inversely proportional to its mass.

$$a = \frac{\Sigma F}{m}$$

5. $\Sigma F = ma$

$$= (20\,000)(1)$$

$$\Sigma F = 20\,000 \text{ N}$$

6. a) applied force must be 100 N

b) $\Sigma F = 0$

c) $a = 0$

7. $a = \frac{\Sigma F}{m}$

$$= \frac{500}{2000}$$

$$a = 0.25 \text{ m/s}^2$$

8. $a = \frac{\Sigma F}{m}$

$$= \frac{120\,000}{300\,000}$$ → $4 \times 30\,000$

$$= 0.4 \text{ m/s}^2$$

(9) $a = \frac{\Sigma F}{m}$

$= \frac{20}{2}$

$= 10\ m/s^2$

(10) $a = \frac{\Sigma F}{m}$ $\qquad \Sigma F = 20 - 4 = 16\ N$

$= \frac{16}{2}$

$= 8\ m/s^2$

(11) $\Sigma F = ma$

$= (1)(9.8)$

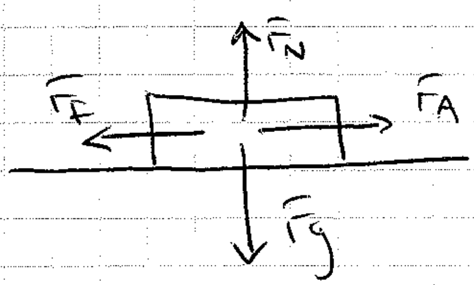
$= 9.8\ N$

(12) $\Sigma F = ma$ $\qquad 1.8g = 1.8(9.8) = 17.64\ m/s^2$

$= (1.2)(17.64)$

$= 21.2\ N$

(13) No. There could be two (or more) forces acting on it that are cancelling out.



$\vec{F}_N = -\vec{F}_g$

$\vec{F}_A = -\vec{F}_f$

$\therefore \Sigma F = 0$ and $a = 0$

(14) $\Sigma F = ma$

$2 = (2)a$

$a = 1 \text{ m/s}^2$

(15) $\Sigma F = ma$

$120\,000 = (30\,000)a$

$a = 4 \text{ m/s}^2$

(16) <u>2 Kg</u> | <u>4 Kg</u>

$\Sigma F = ma$ | $\Sigma F = ma$

$= (2)(3)$ | $6 = (4)a$

$= 6 \text{ N}$ | $a = 1.5 \text{ m/s}^2$

(17) $\Sigma F = 0$ since the crate has constant speed

$F_f = -100 \text{ N}$ since F_f must cancel the horizontal force to make net force zero.

(18) $\frac{3}{4}$ of the original force will result in $\frac{3}{4}$ of the original acceleration.

$\frac{3}{4}a = \frac{3}{4}(2) = 1.5 \text{ m/s}^2$

(19) $\frac{3}{4}$ of original mass will result in $\frac{4}{3}$ of the original acceleration.

$\frac{4}{3}a = \frac{4}{3}(1) = 1.\overline{3} \text{ m/s}^2$

(20) $30g = 30(9.8) = 294 \ m/s^2$

$\Sigma F = ma$

$= (70)(294)$

$\Sigma F = 20\ 580\ N$