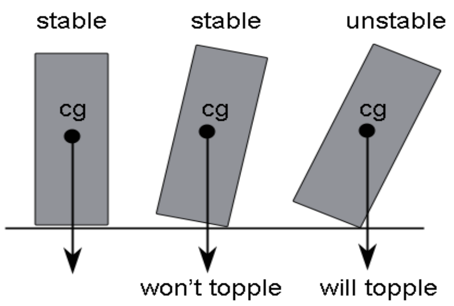
Assess Quizzes from the o-book – Explanations for the answers.

Chapter 11 Review – Support

Q	Reason
1	See page 312 for a fuller description. The option “as long as there are unbalanced forces acting on it” may seem correct but if this is happening the object cannot be at rest to start with.
2	$\overrightarrow{F_{net}} = \overrightarrow{F_W} + \overrightarrow{F_D} = 1.0 + (-0.2) = 0.8N$
3	F_W down, F_f up. Answer 2. Note that the question doesn’t mention friction, the fact that it says “tennis” ball implies that it is a rough surface and will experience air resistance. If the question said “in a vacuum” then there would be just the one force acting: weight, F_W acting down. Note also that in Unit 3, the symbol for the gravitational force F_g will be introduced to replace F_W.
4	Newton’s 2nd law: $F_{Net} = ma$, or $F \propto a$ if mass is constant.
5	$F = ma_1$ $3F = ma_2$ $a_2 = \frac{3F}{m}$ $a_2 = \frac{3 \times ma_1}{m}$ $a_2 = 3a_1$ Thus, the new acceleration (a_2) will be three times greater than the original value (a_1).
6	Equal and opposite force so that $F_{net} = 0$. Hence, a force of equal magnitude (10 N) and opposite direction (south).
7	The milk carton has inertia, which means that if it is at rest it will tend to stay at rest until a net force acts. The force of friction between the paper and the bottom of the carton is not enough to pull the base of the carton sideways so much that it will topple. For it to topple, the centre of gravity (cg) of the carton has to be not over the base. Read about it page 313. 
8	Has to be equal and opposite. The ball and the Earth pull each other towards one another.
9	Change in velocity means there is acceleration. The formula $F_{net} = ma$ shows this.

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10	 $\vec{F_{net}} = \vec{F_A} + \vec{F_f}$ $= +10 + (-4)\ [let + be\ to\ the\ right]$ $= +6\,N$ $\vec{F} = m\vec{a}$ $\vec{a} = \frac{\vec{F_{net}}}{m} = \frac{+6\,N}{2} = +3\,m\,s^{-2}$ $a = 3\,m\,s^{-2}\ to\ the\ right$

Chapter 11 Review – Consolidate

Q	Reason
1	$F_{net} = 5N\ south$ $a = \frac{F_{net}}{m} = \frac{5}{0.5} = 10\,m\,s^{-2}\ south$
2	$\vec{F_{net}} = \vec{F_W} + \vec{F_f}$ $= -10 + (+4)\ [let - be\ down]$ $= -6\,N$ $\vec{F_W} = m\vec{g}$ $m = \frac{F_W}{g} = \frac{10}{9.8} = 1.02\,kg$ $\vec{a} = \frac{\vec{F_{net}}}{m} = \frac{-6\,N}{1.02} = -5.9\,m\,s^{-2}$ $Answer: a = 6\,m\,s^{-2}$
3	$\vec{F} = m\vec{a} = 50 \times 4 = 200\,N\,[to\ the\ right]$ $\vec{F_{net}} = \vec{F_A} + \vec{F_f}$ $+200 = +450 + \vec{F_f}\ [let + be\ to\ the\ right]$ $\vec{F_f} = +200 - (+450) = -250\,N\,[to\ the\ left]$ $Answer = 250N$

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4	$s = ut + \tfrac{1}{2}at^2$ $64 = 0 + \tfrac{1}{2}a \times 4^2$ $a = \dfrac{2 \times 64}{16}$ $= 8\,m\,s^{-2}$
5	There is no motion of the box in the direction of the force (vertically, either up or down), so the displacement *s* is zero. $W = Fs\cos\theta\ [\theta = 0^\circ]$ $= 40 \times 0 \times \cos 0^\circ$ $= 0\,N$

Chapter 11 Review – Extend

Q	Reason
1	$s = ut + \tfrac{1}{2}at^2$ $s = 0 + \tfrac{1}{2}at^2$ $t^2 = \dfrac{2s}{a}$
2	$F_{net} = Mg$ $Mg = (M + M)a$ $a = \dfrac{Mg}{2M} = \dfrac{g}{2}$ Note that the force of gravity acting on the hanging mass M provides the net force acting on the system of the two masses. The total mass being accelerated by the net force is M + M which equals 2M. So to work out the acceleration of the system we use 2M as the mass being accelerated by the net force F_{net}. This value for acceleration will be the acceleration of either mass. The sliding mass will just accelerate sideways at g/2, and the hanging mass will accelerate downwards at g/2.
3	$a = \dfrac{F_1}{m_1}$ $a_2 = \dfrac{F_2}{m_2} = \dfrac{6F_1}{2m_1} = 3\dfrac{F_1}{m_1} = 3a$

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4	$F_{net} = F_f = 0.4 \times 3500 \times 9.8 = 1.3720 \times 10^4\, N$ $a = \frac{F}{m} = \frac{1.372 \times 10^4}{3500} = 3.92\, m\, s^{-2}$ $v^2 = u^2 + 2as$ $0 = 25^2 + 2 \times (-3.92)s$ $s = 79.7194\, m\ (80\, m)$
5	$W = Fs$ $= 1.372 \times 10^4 \times 79.719 = 1.093750 \times 10^6\, J$ Note that we assume the frictional force acts parallel to the surface and not at some angle.