QUESTION NUMBER	SCHEME	MARKS
1(a)	Resultant force $(6\mathbf{i} + 8\mathbf{j})+(-16\mathbf{i}+2\mathbf{j})+(-2\mathbf{i}+8\mathbf{j})$	M1
	N2L $-12\mathbf{i} +18\ \mathbf{j} = 2.5\mathbf{a}$ oe **OR** $\sqrt{((-)12)^2 +18^2} = 2.5a$ oe	M1
	Pythagoras $\sqrt{((-)4.8)^2 +(7.2)^2}$ **OR** $\sqrt{((-)12)^2 +18^2}$	M1
	8.7 or better (m s^{-2})	A1
		(4)
1(b)	$-12\mathbf{i} +18\mathbf{j} + p\mathbf{i} + p\mathbf{j} = (-12+p)\mathbf{i} + (18+p)\mathbf{j}$	M1
	$\frac{-12+p}{18+p} = \frac{7}{2}$	M1 A1
	$p = -30$	A1
		(4)
		(8)
	Notes for Question 1	
	Accept column vectors throughout	
1(a)		
M1	Find the resultant force by finding the sum of $\mathbf{F}_1$, $\mathbf{F}_2$ and $\mathbf{F}_3$ **i**'s and **j**'s do NOT need collecting	
M1	Use of N2L, in vector or scalar form, with their resultant force	
M1	Use of Pythagoras to find a magnitude. This may be magnitude of acceleration or magnitude of their resultant force if carried out before N2L.	
A1	Correct answer from correct working. Exact value is $\frac{12}{5}\sqrt{13}$, accept 8.7 or better. (8.653323061..)	
1(b)		
M1	Find the resultant **force** AND collect **i**'s and **j**'s. Can be scored for a clear **attempt** at adding $p\mathbf{i} + p\mathbf{j}$ to their possibly incorrect resultant from (a)	
M1	Use direction $7\mathbf{i} + 2\mathbf{j}$ with their **i** and **j** components of their resultant **force** to form a ratio equation in p ONLY. Condone a sign error and reciprocal, but must be using 7 and 2. May use $(-12+p)\mathbf{i} + (18+p)\mathbf{j} = \lambda(7\mathbf{i} + 2\mathbf{j})$, equate components AND eliminate $\lambda (= -6)$ to form an equation in p ONLY.	
A1	Correct unsimplified equation in p ONLY.	
A1	Correct answer.	