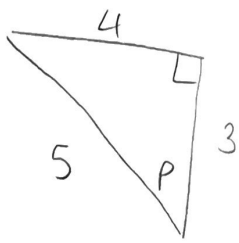
QUESTION NUMBER

4.(a) (i)

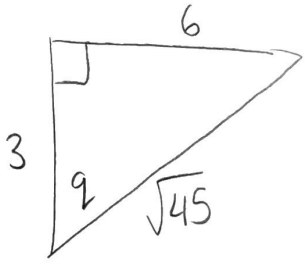
$$\cos p = \frac{3}{5}$$



DO NOT WRITE IN THIS MARGIN

4.(a) (ii)

$$\cos q = \frac{3}{\sqrt{45}}$$



4.(b)

$$\cos(p+q)$$

$$= \cos p \cos q - \sin p \sin q$$

$$= \frac{3}{5} \cdot \frac{3}{\sqrt{45}} - \frac{4}{5} \cdot \frac{6}{\sqrt{45}}$$

$$= \frac{9}{5\sqrt{45}} - \frac{24}{5\sqrt{45}}$$

$$= \frac{-15}{5\sqrt{45}} = -\frac{3}{\sqrt{45}} = -\frac{3}{3\sqrt{5}} = -\frac{1}{\sqrt{5}}$$

Question			Generic scheme	Illustrative scheme	Max mark
4.	(a)		$\bullet^1$ find $\cos p$	$\bullet^1$ $\frac{3}{5}$	**1**
			$\bullet^2$ find $\cos q$	$\bullet^2$ $\frac{3}{\sqrt{45}}\left(=\frac{1}{\sqrt{5}}\right)$	**1**
Notes:					
1. Accept $\frac{3}{3\sqrt{5}}$ for $\bullet^2$.					
Commonly Observed Responses:					
	(b)		$\bullet^3$ select appropriate formula and express in terms of p and q $\bullet^4$ substitute into addition formula $\bullet^5$ evaluate $\cos(p+q)$	$\bullet^3$ $\cos p\cos q-\sin p\sin q$ $\bullet^4$ $\frac{3}{5}\times\frac{3}{\sqrt{45}}-\frac{4}{5}\times\frac{6}{\sqrt{45}}$ $\bullet^5$ $-\frac{3}{\sqrt{45}}\left(=-\frac{1}{\sqrt{5}}\right)$	**3**
Notes:					
2. Award $\bullet^3$ for candidates who write $\cos\left(\frac{3}{5}\right)\times\cos\left(\frac{3}{\sqrt{45}}\right)-\sin\left(\frac{4}{5}\right)\times\sin\left(\frac{6}{\sqrt{45}}\right)$. $\bullet^4$ and $\bullet^5$ are unavailable. 3. For any attempt to use $\cos(p+q)=\cos p\pm\cos q$, $\bullet^4$ and $\bullet^5$ are unavailable. 4. $\bullet^5$ is only available if either the surd part or the non-surd part of the fraction is simplified as far as possible. Accept $-\frac{3}{\sqrt{45}}$, $-\frac{\sqrt{45}}{15}$, $-\frac{15}{15\sqrt{5}}$ or answers obtained on follow through which do not require simplification. Do not accept $-\frac{15}{5\sqrt{45}}$. 5. $\bullet^5$ is only available for an answer expressed as a single fraction.					
Commonly Observed Responses:					