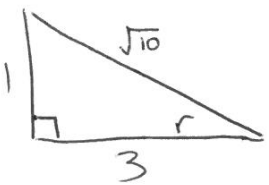
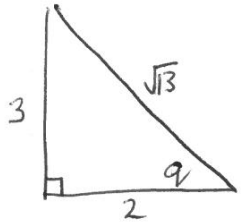
7. a) i)



$\sin r = \frac{1}{\sqrt{10}}$

ii)



$\sin q = \frac{3}{\sqrt{13}}$

b) $\sin(q-r) = \sin q \cos r - \cos q \sin r$

$= \frac{3}{\sqrt{13}} \cdot \frac{3}{\sqrt{10}} - \frac{2}{\sqrt{13}} \frac{1}{\sqrt{10}}$

$= \frac{9}{\sqrt{130}} - \frac{2}{\sqrt{130}}$

$= \frac{7}{\sqrt{130}}$

Question			Generic Scheme	Illustrative Scheme	Max Mark
7.	(a)	(i)	$\bullet^1$ determine $\sin r$	$\bullet^1$ $\frac{1}{\sqrt{10}}$	**1**
		(ii)	$\bullet^2$ determine $\sin q$	$\bullet^2$ $\frac{3}{\sqrt{13}}$	**1**

Notes:

1. In (a)(ii), where candidates do not simplify the perfect square see Candidates A and B.

Commonly Observed Responses:

Candidate A

$\sin q = \frac{\sqrt{9}}{\sqrt{13}}$ $\bullet^2$ ✓ 2

Candidate B - simplification in part (b)

(a)(ii) $\sin q = \frac{\sqrt{9}}{\sqrt{13}}$ $\bullet^2$ ✓

(b) $\sin(q-r) = \frac{7}{\cdots}$

Roots have been simplified in (b)

Question			Generic Scheme	Illustrative Scheme	Max Mark
7.	(b)		$\bullet^3$ select appropriate formula and express in terms of p and q $\bullet^4$ substitute into addition formula $\bullet^5$ evaluate $\sin(q-r)$	$\bullet^3$ $\sin q\cos r-\cos q\sin r$ stated or implied by $\bullet^4$ $\bullet^4$ $\frac{3}{\sqrt{13}}\times\frac{3}{\sqrt{10}}-\frac{2}{\sqrt{13}}\times\frac{1}{\sqrt{10}}$ $\bullet^5$ $\frac{7}{\sqrt{130}}$	**3**

Notes:

2. Award $\bullet^3$ for candidates who write $\sin\left(\frac{3}{\sqrt{13}}\right)\times\cos\left(\frac{3}{\sqrt{10}}\right)-\sin\left(\frac{2}{\sqrt{13}}\right)\times\cos\left(\frac{1}{\sqrt{10}}\right)$. $\bullet^4$ and $\bullet^5$ are unavailable.
3. For any attempt to use $\sin(q-r)=\sin q-\sin r$, $\bullet^4$ and $\bullet^5$ are unavailable.
4. At $\bullet^5$, the answer must be given as a single fraction. Accept $\frac{7}{\sqrt{13}\sqrt{10}}$, $\frac{7\sqrt{10}}{10\sqrt{13}}$ and $\frac{7\sqrt{13}}{13\sqrt{10}}$.
5. Do not penalise trigonometric ratios which are less than -1 or greater than 1.

Commonly Observed Responses: