Higher 2022 Paper 2

1. a) $m_{AB} = \frac{-4--1}{2--1} = \frac{-3}{3} = -1$

$m_{\perp} = 1$

$y - 3 = 1(x - 7)$

$y - 3 = x - 7$

$y - x = -4$

b) $\text{mid}_{AC} = \left(\frac{-1+7}{2}, \frac{-1+3}{2}\right) = (3, 1)$

$m = \frac{-4-1}{2-3} = \frac{-5}{-1} = 5$

$y + 4 = 5(x - 2)$

$y + 4 = 5x - 10$

$y - 5x = -14$

c) $y - x = -4$ ①

$y - 5x = -14$ ②

① - ②

$4x = 10$

$x = 2.5$

$y - 2.5 = -4$

$y = -4 + 2.5$

$y = -1.5$

$(2.5, -1.5)$

Question			Generic scheme	Illustrative scheme	Max mark
1.	(b)		•4 determine midpoint of AC •5 determine gradient of median •6 find equation	•4 $(3,1)$ •5 5 •6 $y=5x-14$	3

Notes:

3. •5 is only available to candidates who use a midpoint to find a gradient.
4. •6 is only available as a consequence of using a 'midpoint' of AC and the point B.
5. At •6, accept any arrangement of a candidate's equation where constant terms have been simplified.
6. •6 is not available as a consequence of using a perpendicular gradient.

Commonly Observed Responses:

Candidate A – Perpendicular bisector of AC

$\text{Midpoint}_{AC}(3,1)$ •1 ✓

$m_{AC}=\frac{1}{2}\Rightarrow m_{\perp}=-2$ •2 ✗

$y+2x=7$ •3 ✓ 2

For other perpendicular bisectors award 0/3

Candidate B – Altitude through B

$m_{AC}=\frac{1}{2}$ •1 ^

$m_{\perp}=-2$ •2 ✗

$y+2x=0$ •3 ✓ 2

Candidate C – Median through A

$\text{Midpoint}_{BC}\left(\frac{9}{2},-\frac{1}{2}\right)$ •1 ✗

$m_{AM}=\frac{1}{11}$ •2 ✓ 1

$11y=x-10$ •3 ✓ 2

Candidate D – Median through C

$\text{Midpoint}_{AB}\left(\frac{1}{2},-\frac{5}{2}\right)$ •1 ✗

$m_{CM}=\frac{11}{13}$ •2 ✓ 1

$13y=11x-38$ •3 ✓ 2

	(c)		•7 determine x-coordinate •8 determine y-coordinate	•7 2.5 •8 −1.5	2

Notes:

7. For $\left(\frac{10}{4},-\frac{6}{4}\right)$ award 1/2 (do not penalise repeated lack of simplification – *general marking principle* (*l*)).

Commonly Observed Responses: