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| 8 | <p>(a) $k = \alpha/\beta \times \beta/\alpha = 1$</p> <p>(b) $\alpha\beta = 15$ and $\alpha + \beta = -m$ $-h = \alpha/\beta + \beta/\alpha$ $= \frac{\alpha^2 + \beta^2}{\alpha\beta}$ $= \frac{(\alpha + \beta)^2 - 2\alpha\beta}{\beta\alpha}$ $\Rightarrow h = \frac{30 - m^2}{15}$</p> <p>(c) $\alpha\beta = 15 \Rightarrow \alpha(2\alpha + 1) = 15$ $2\alpha^2 + \alpha - 15 = 0$ $(2\alpha - 5)(\alpha + 3) = 0$ $\alpha = 2\frac{1}{2}$ or $\alpha = -3$</p> <p>(d) $\beta = 2 \times 2\frac{1}{2} + 1 = 6$ or $\beta = 2 \times -3 + 1 = -5$ $m = -(\alpha + \beta) = -(2\frac{1}{2} + 6)$ or $-(-3 - 5)$ $m = -8\frac{1}{2}$ or 8</p> | <p>B1</p> <p>M1 A1 M1</p> <p>M1</p> <p>M1</p> <p>A1 oe</p> <p>M1</p> <p>M1 A1</p> <p>M1 M1 A1 13</p> |
| 9 | <p>(a) $BD^2 = 5^2 + 6^2 = 61$, $BC^2 = 8^2 + 6^2 = 100$, $CD^2 = 8^2 + 5^2 = 89$ $100 = 61 + 89 - 2\sqrt{61}\sqrt{89}\cos BDC$ $\cos BDC = 25/\sqrt{(61 \times 89)}$ $= 0.3393$ $\angle BDC = 70.2^\circ$</p> <p>(b) Area $BDC = \frac{1}{2}\sqrt{61}\sqrt{89}\sin 70.2^\circ$ $= 34.7 \text{ cm}^2$ (3sf)</p> <p>(c) Area $DAC = \frac{1}{2} \times 5 \times 8 = 20$</p> <p>(d) $20 = \frac{1}{2} \times \sqrt{89} \times AE \Rightarrow AE = 40/\sqrt{89}$</p> <p>(e) Angle is $\angle BEA$ $\tan BEA = 6/AE = 6\sqrt{89}/40$ $= 1.415$ $\Rightarrow \angle BEA = 54.8^\circ$</p> | <p>M1 A2, 1, 0 M1 A1</p> <p>A1</p> <p>M1 A1ft A1 allow 34.6</p> <p>B1</p> <p>M1 A1</p> <p>M1 identify angle M1 A1ft</p> <p>A1 16</p> |