QUESTION 5.2

(a) $\cos \text{ADB} = \dfrac{12^2 + 20^2 - 28^2}{2(12)(20)}$ ***(M1)(A1)***

> **Notes:** Award ***(M1)*** for substituted cosine rule formula, ***(A1)*** for correct substitutions.

$\angle \text{ADB} = 120°$ ***(A1)(G2)*** ***[3 marks]***

(b) $\text{Area} = \dfrac{(12)(20)\sin 120°}{2}$ ***(M1)(A1)*(ft)**

> **Notes:** Award ***(M1)*** for substituted area formula, ***(A1)*(ft)** for their correct substitutions.

$= 104 \text{ cm}^2 \quad (103.923\ldots\text{cm}^2)$ ***(A1)*(ft)*(G2)*** ***[3 marks]***

> **Note:** The final answer is 104 cm^2, **the units are required**. Accept 100 cm^2.

(c) $\dfrac{\sin \text{BCD}}{12} = \dfrac{\sin 60°}{13}$ ***(A1)*(ft)*(M1)(A1)***

> **Note:** Award ***(A1)*(ft)** for their 60 seen, ***(M1)*** for substituted sine rule formula, ***(A1)*** for correct substitutions.

$\text{BCD} = 53.1° \quad (53.0736\ldots)$ ***(A1)(G3)*** ***[4 marks]***

> **Note:** Accept 53, do not accept 50 or 53.0.

continued…

Question 5.2 continued

(d) Using triangle ABC

$$\frac{\sin \text{BAC}}{13} = \frac{\sin 53.1°}{28}$$ ***(M1)(A1)*(ft)**

OR

Using triangle ABD

$$\frac{\sin \text{BAD}}{12} = \frac{\sin 120°}{28}$$ ***(M1)(A1)*(ft)**

Note: Award ***(M1)*** for substituted sine rule formula (one of the above), ***(A1)*(ft)** for their correct substitutions. Follow through from (a) or (c) as appropriate.

$\text{BAC} = \text{BAD} = 21.8°$ (21.7867…) ***(A1)*(ft)*(G2)***

Notes: Accept 22, do not accept 20 or 21.7. Accept equivalent methods, for example cosine rule.

$180° - (53.1° + 21.8°) \neq 90°$, hence triangle ABC is not right angled ***(R1)(AG)***

OR

$$\frac{\text{CD}}{\sin 66.9°} = \frac{13}{\sin 60°}$$ ***(M1)(A1)*(ft)**

Note: Award ***(M1)*** for substituted sine rule formula, ***(A1)*(ft)** for their correct substitutions. Follow through from (a) and (c).

$\text{CD} = 13.8$ (13.8075...) ***(A1)*(ft)**

$13^3 + 28^2 \neq 33.8^2$, hence triangle ABC is not right angled. ***(R1)*(ft)*(AG)*** ***[4 marks]***

Note: The complete statement is required for the final ***(R1)*** to be awarded.

Total *[14 marks]*